

Montgomery County
SHORT TERM TRAFFIC ALLEVIATION POLICY

(Interim Growth Policy)

Prepared by

**The Montgomery County Planning Board
Maryland-National Capital Park and Planning Commission**

Revised by

County Executive Charles W. Gilchrist

Adopted by

The Montgomery County Council

September 30, 1986

ABSTRACT

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ABSTRACT: This document analyzes traffic level of service forecasts for the two year period from July 1986 through June 1988, and recommends traffic alleviation methods. Traffic is projected to increase as a function of housing and employment growth. A preliminary model shows that traffic congestion is influenced by home-based, trip-based, and work-based factors. A wide spectrum of potential alleviation measures in the areas of employment activity, parking, bicycle and pedestrian, public and private transit, and ridesharing is discussed and analyzed for potential effectiveness, ease of implementation, and cost to the public. Of these, 16 measures are recommended and their impact by policy area is predicted.

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

The Maryland-National Capital Park and Planning Commission is a bi-county agency created by the General Assembly of Maryland in 1927. The Commission's geographic authority extends to the great majority of Montgomery and Prince George's Counties; the Maryland-Washington Regional District (M-NCPPC planning jurisdiction) comprises 1,001 square miles, while the Metropolitan District (parks) comprises 919 square miles, in the two Counties.

The Commission has three major functions:

- (1) The preparation, adoption, and, from time to time, amendment or extension of the General Plan for the physical development of the Maryland-Washington Regional District;
- (2) The acquisition, development, operation, and maintenance of a public park system; and
- (3) In Prince George's County only, the operation of the entire County public recreation program.

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MONTGOMERY COUNTY
MARYLAND

SHORT TERM TRAFFIC ALLEVIATION POLICY

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CHAPTER I: AN ASSESSMENT OF RECENT AND NEAR TERM PROJECTED DEVELOPMENT ACTIVITY

A. General Overview

Section 33A-14 of The Montgomery County Code calls for the Interim Growth Policy to include "an assessment of recent and near term projected development activity." The function of this short term forecast is to provide a basis for assessing the effect of this growth on the level of traffic congestion throughout the county in the near term future. This chapter describes the methods used to make a short term forecast for both housing and employment (i.e. "near term projected development activity") and also includes an analysis of the current status of approved development permits, or what is frequently called the development pipeline (i.e. "recent...development activity").

"Near term" is defined in this report as meaning a two year period between July 1, 1986 and June 30, 1988, which coincides with the next two fiscal years. In the past the Planning Department has prepared forecasts for five and ten year periods, but this is the first time an effort has been made to forecast for a period as short as two years from the present. A five-year forecast allows one to focus on the average trend line over the period, without regard to the individual year by year fluctuations. A two year forecast is more difficult in a sense, because of the difficulty in pinpointing these short range fluctuations. Thus, although it is true that long term forecasts are statistically less reliable than short term forecasts, there remains a high degree of uncertainty associated with even a two year forecast.

Because of the uncertainty factor, this forecast is expressed in terms of a range of possibilities rather than a single specific figure. A "most probable" forecast is identified (i.e. the intermediate forecast) but it is pointed out that a certain scenario of events must take place in order for this forecast to become reality. If a different scenario comes to pass, then the outcome will be closer to the high forecast; whereas if another different scenario comes to pass, the outcome will be closer to the low forecast. The important thing to keep in mind in using forecasts, therefore, is that they must be accompanied by a risk assessment process, in which a judgment is made as to whether it is worse to err on the side of the forecast being too high, or worse to err on the side of the forecast being too low. The conclusions reached in this report are based on the assumption that the intermediate forecast is the most likely scenario to occur. The Executive and Council should keep in mind however, that risk assessment is a policy judgment which they should make consciously as they consider these recommendations.

In considering the forces at work that will influence the future, it is necessary to distinguish between those that affect employment and those that affect housing. Although they share many common characteristics, there are some aspects which are quite different between these two functional sectors of the economy. In terms of the total Washington metropolitan area, the employment sector is the ultimate driver of the housing sector. However, in terms of a single jurisdiction within the Washington metropolitan area, it is quite possible for the local housing market to be linked more closely to the regional employment market than to the local employment market. Thus, it is possible for the local housing growth rate to fluctuate somewhat differently from the local employment growth rate. This chapter seeks to analyze these two market sectors separately, in order to better understand their individual dynamics. It must be emphasized however, that the interrelationships among influencing factors are very complex, and that this is an experimental effort in short term forecasting for local areas. Public dialogue during the hearing process should help to correct any errors of perception or emphasis that may remain undetected thus far.

It should be noted that the total amount of growth forecasted for the next two year period is significantly lower than the total amount of growth that must potentially be accommodated by the development pipeline. For example, the intermediate forecast would use up only about one quarter of the pipeline of approved preliminary plans for employment and about one half of the same pipeline for housing. This relationship is a natural one because the average build out time of subdivisions is more than two years. Any orderly development process requires an adequate inventory of approved preliminary plans (i.e. a pipeline) and therefore it is to be expected that the pipeline will be larger than the short term forecast.

One significant aspect of this proportional relationship is that the forecast can be made without regard to any constraints that may accrue because of future limitations on further subdivision approvals. Because the market forecast is smaller than the pipeline, it is not necessary to assess the effect on the forecast of the current moratorium on preliminary subdivision plans in certain areas of the county. It is possible that a continuing limitation on further subdivisions would affect real estate sales prices and builders' strategies, but within the next two year period this is assumed in this report to be of marginal impact on the market forces affecting completions and sales. Therefore, the next two sections of this chapter, dealing with employment and housing, concentrate simply on the analysis of market forces. The final section of this chapter provides information on the pipeline only for reference purposes.

B. Employment Outlook for FY 87 and FY 88

1. Employment Overview

The presence of a new non-residential building does not "create" new jobs (other than temporary construction work). The companies occupying this new space provide jobs which are either new or relocated from other locations. The past few years have witnessed new office construction in excess of the economy's ability to fill that space. This recent phenomenon is caused by the tax advantages these structures have and the long-term interests of large-scale real estate investors.

Prior to 1980, the bulk of non-residential space constructed in the County was for a specific single occupant. It is only in recent years that speculative space has become the dominant form of new construction. Nationwide office construction is occurring more because of money in search of a long-term investment than the present need for increased office space. While Montgomery County's current office vacancy rate is not near the excessive 30 percent rate of Houston and Tampa, it is on the rise with substantial new space under construction. The outlook for such speculative space in calendar year 1987 is uncertain. Tax reform in Congress may eliminate some of the tax advantaged aspects of real estate investments. Simply lowering the highest marginal tax rates would make economically sound investment more popular than tax advantaged investments. Even so, a two-year employment forecast would probably be unaffected by buildings starting in 1987. Generally, major buildings take at least a year to construct.

Since office and commercial leasing generally take 18 months or so, the bulk of the space which will house new employees over the next 2 years is already on the ground or in the final phases of completion. The greatest issue for the two-year forecast is how fast this new space becomes occupied. New starts will only have some effect on the second year of the forecasted range.

Basically, a continuation of the present trends in employment growth and non-residential occupancy rates is assumed in the forecast. In its basic elements, the forecast is dependent upon leasing experience between 1983 and 1986 for presently vacant space and space under construction. A study of these recently completed buildings indicates that most are fully occupied within three years. When space is first leased, there are fewer employees per square foot of space than will eventually occupy the building. Many employers lease with the idea of expanding their work force within the same leased area thereafter.

Full space utilization is assumed to take two to three years longer as firms grow in place and space is absorbed at the expense of increased vacancy in existing space as firms relocate to the newer space. These three factors: lease-up period, slowly increasing intensity of space use, and some transfer of

vacancy from new to old space are judgmentally considered in making this forecast. The "pace" at which this space becomes occupied is assumed to continue in the future. Essentially, a building projected to be completed in 1987 is anticipated to be 40 percent leased at the time of completion. This method results in an "assumed" vacancy rate which is shown in Table 1 below.

TABLE 1.
FY 88 FORECASTED VACANCY RATES COMPARED TO EXISTING RATES
FOR BUILDINGS COMPLETED AS OF FY 88

	Office	Retail	Industrial
High Forecast	16%	3%	11%
Intermediate Forecast	18%	5%	13%
Low Forecast	20%	6%	14%
Existing (Spring 1986)	16%	3%	6%

This report does not examine the national and regional factors which cause job increases in the County. The analysis is strongly influenced by our recent job growth history and the Metropolitan Washington Council of Governments' latest regional forecasts. Although this outlook is bullish from a historical perspective, there are several possible clouds in the silver lining.

The first is the region's growing dependence on the private economy. While this trend helps to counter potential federal government cutbacks, it makes the region more susceptible to national business cycles. A national recession which adversely affects the region would require revised forecast assumptions.

The second possible cloud is the potential negative impact that Gramm-Rudman-Hollings legislation may have on the local economy. According to a report prepared by the Montgomery County Council's Economic and Budget Strategy Committee on the impact of this legislation, "anticipated shrinkage in federal procurement dollars may reduce annual economic growth in the County by two percentage points and probably less." If cuts in the federal budget have a greater impact than anticipated by this committee, the forecasted range of employment growth may be found to be too high.

The third cloud is the potential negative implications of tax reform legislation on real estate development. These reforms, as proposed, will make real estate investment for tax shelter purposes much less attractive. The short-term, two-year effect could be to reduce the number of construction workers in the County. Jobs in construction industries represent approximately ten percent of total at-place employment.

2. The Regional Environment

Montgomery County has shared the same robust and vigorous economic climate of the larger Washington, D.C. metropolitan area in recent years. The region's private sector grew by 5 percent, or 51,000 jobs, between February 1985 and February 1986, according to the Department of Employment Services of the District of Columbia. Preponderant regional gains occurred in suburban jurisdictions, 45,100 jobs, or 88 percent of total growth.

The region's unemployment rate of 3.8 percent in February is among the lowest of the nation's larger metropolitan areas, second only to Boston's. Reflecting the above mentioned disparate rates of job growth, suburban unemployment amounted to only 3.1 percent and in Montgomery County it was only 2.3 percent. This low unemployment rate indicates that employment growth in the County will have to be met substantially through in-commutation or in-migration, especially in light of the County's already high female labor force participation rate.

3. Recent and Prospective Employment Growth in Montgomery County

County employment growth virtually came to a halt in 1982 during the 1981-82 recession. The economy recovered rapidly, however, and experienced annual employment increases of 10,000 jobs and more thereafter.

At-place employment in Montgomery County for the FY 87 and FY 88 periods are forecast to increase by between 13,000 and 34,000 net new jobs. The two-year Intermediate Forecast of 22,500 net new jobs translates into a higher rate of growth than the annual 10,300 job gain experienced between 1979-1985, a period which was characterized by two recessions. It falls short, however, of the extraordinary annual gains, averaging 15,000 jobs, experienced in the 1984-1986 period. Tables 1A and 2 show the Montgomery County employment forecast range and employment trends since 1979.

Table 1A.

MONTGOMERY COUNTY EMPLOYMENT FORECAST FY 87 AND FY 88 (Increase in Number of Employees)

	FY 87	FY 88	Total FY 87 and FY 88
High (maximum foreseeable)	18,500	15,500	34,000
INTERMEDIATE (most probable)	12,500	10,000	22,500
Low (minimum foreseeable)	7,000	6,000	13,000

Source: Research Division, Montgomery County Planning Department.

Table 2.

MONTGOMERY COUNTY EMPLOYMENT GROWTH
(Number of Jobs as of March 1986)

	Total Employment	Annual Increase
1979	296,633	
1980	301,723	5,090
1981	310,356	8,633
1982	310,518	162
1983	320,430	9,912
1984	335,430*	15,000
1985	351,000*	15,570
1986	365,780**	14,780
1987	378,280**	12,500
1988	388,280**	10,000

* Estimated as of June 1986.

**Intermediate forecast as of July.

Source: County Business Patterns and Research Division, Montgomery County Planning Department. County Business Patterns are not yet published for those years beyond 1983. This necessitates the use of estimates for 1984-1986.

The scenarios used in this employment forecast are based on the following:

- The High Forecast would be premised upon an optimistic assessment of the local economy and its ability to absorb newly constructed space. The vacancy rate for all County office space would be likely to remain at or near the current 16 percent level. In this scenario, demand for retail and industrial space would be expected to be moderately higher with vacancy rates of only 3 and 11 percent, respectively. Gramm-Rudman-Hollings legislation and tax reform legislation would be assumed to have few if any adverse impacts on the local economy.

The underlying picture for this forecast would be bullish. Private employment gains would be the dynamic driver of growth. High tech defense contractors might be the leading sector. Biotech industries spurred by generic engineering and other medical research companies could conceivably start their hoped for exponential growth cycle. Business services would likely expand to provide for this continued boom.

- The Intermediate Forecast would assume that the regional and local economy continue to grow at approximately the same rate as that experienced between 1982 and 1986. Under this scenario, office vacancy rates

would be assumed to rise modestly from the current 16 percent to 18 percent by July of 1988 due to the record level of non-residential completions in calendar year 1985 and the substantial completions expected in 1986 and 1987. Absorption of retail and industrial space would be assumed to remain strong with vacancy rates of newly constructed space only reaching 5 and 13 percent, respectively.

This scenario represents a continuation of an average of the 1982-1986 experience. It would not be quite as hot as our present experience, as the threat of Gramm-Rudman-Hollings has a slightly dampening effect on the County's economy. Tax reform would not be assumed to mean a drastic reduction of new construction. Private sector employment would be assumed to continue growing, albeit at a reduced rate from 1985.

- The Low Forecast would assume that the regional economy grows at a slower pace than in recent years. It presupposes that there is an oversupply of office space which could take several years to absorb. The number of construction jobs in Montgomery County is expected to decline due to the oversupply of office space and the negative implications of tax reform legislation on real estate investment. This slowdown in the local economy's growth rate could also result from adverse local consequences of Gramm-Rudman-Hollings legislation and a tightened credit supply due to national and international political and financial changes. In this scenario, federal budget cutbacks are expected to cause reductions in federal jobs in the County as well as a shrinkage of federal procurement growth among area contractors.

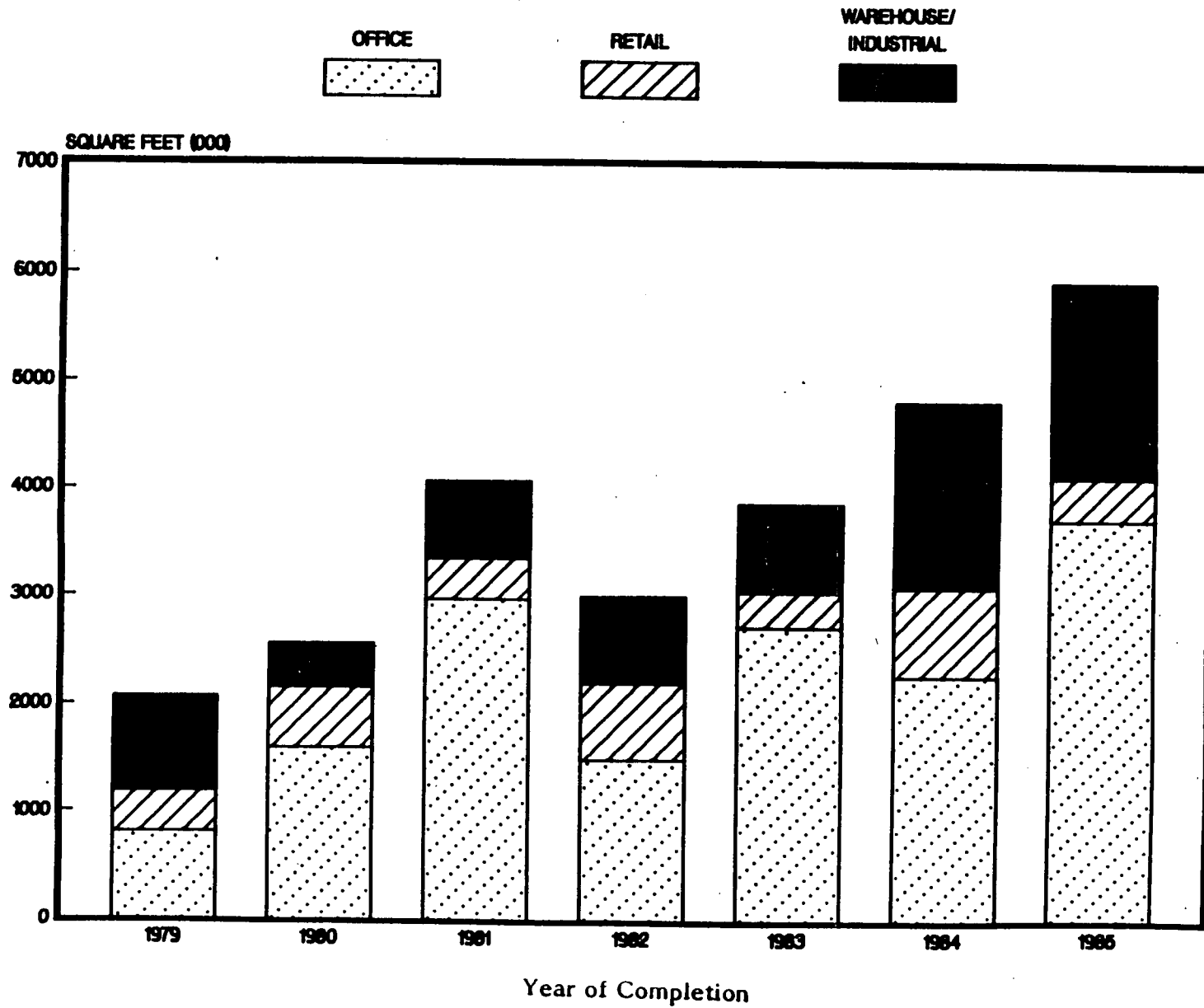
4. Non-Residential Construction Activity

Montgomery County and the entire Washington metropolitan area have been experiencing an unprecedented boom in office construction over the past seven years. Construction of warehouse/industrial and retail space is also high. Nearly 6 million square feet of non-residential space was completed in Montgomery County in 1985 and over 4.8 million in 1984, each more than double the 1979 completion level. Table 3 and Exhibit 1 show Montgomery County's non-residential construction activity since 1979.

Exhibit I

MONTGOMERY COUNTY NON-RESIDENTIAL COMPLETIONS

GROSS FLOOR AREA SQUARE FEET (1979-1985)



Source: Research Division, Montgomery County Planning Board.

Table 3.

MONTGOMERY COUNTY NON-RESIDENTIAL CONSTRUCTION
(Number of Square Feet)

	Office	Retail	Warehouse/ Industrial	Total
1979	812,204	378,526	877,854	2,068,584
1980	1,598,158	554,174	404,924	2,577,256
1981	2,965,365	379,961	722,431	4,067,757
1982	1,496,592	702,878	800,948	3,000,418
1983	2,723,345	322,031	819,488	3,864,864
1984	2,272,551	819,756	1,726,192	4,818,499
1985	3,725,782	395,546	1,806,036	5,927,364

Source: Research Division, Montgomery County Planning Department.

The County's share of regional non-residential building starts has been rising over the past three years. As shown in Exhibit 2, the County's share of non-residential starts has risen from 14 percent in 1984 to 19 percent for the first quarter of 1986. Jurisdictions enjoying the largest increases in commercial and industrial square footage include Fairfax County and the Core Area (Washington, D.C., Arlington, and Alexandria), which represented 28 and 30 percent, respectively, of regional growth.

Office construction represented nearly half the total 1984 non-residential development and more than 62 percent of 1985 activity in Montgomery County. Much of the net increase in office space since 1980 has gone into vacant space. As the office space inventory has increased from around 21 million to about 36 million square feet, the vacancy rate has increased from 3 to 16 percent. In straight square footage terms vacancies have risen from .6 million square feet in 1980 to 5.7 million square feet in the spring of 1986. This means that the pace of office construction in the 1980's has outstripped office employment growth. The total amount of vacant office space in the County is approximately equal to the amount of space completed in 1984 and 1985. The increased vacancy rate has occurred in spite of very strong, industry reported leasing, with 1.6 million square feet leased in the first four months of 1986.

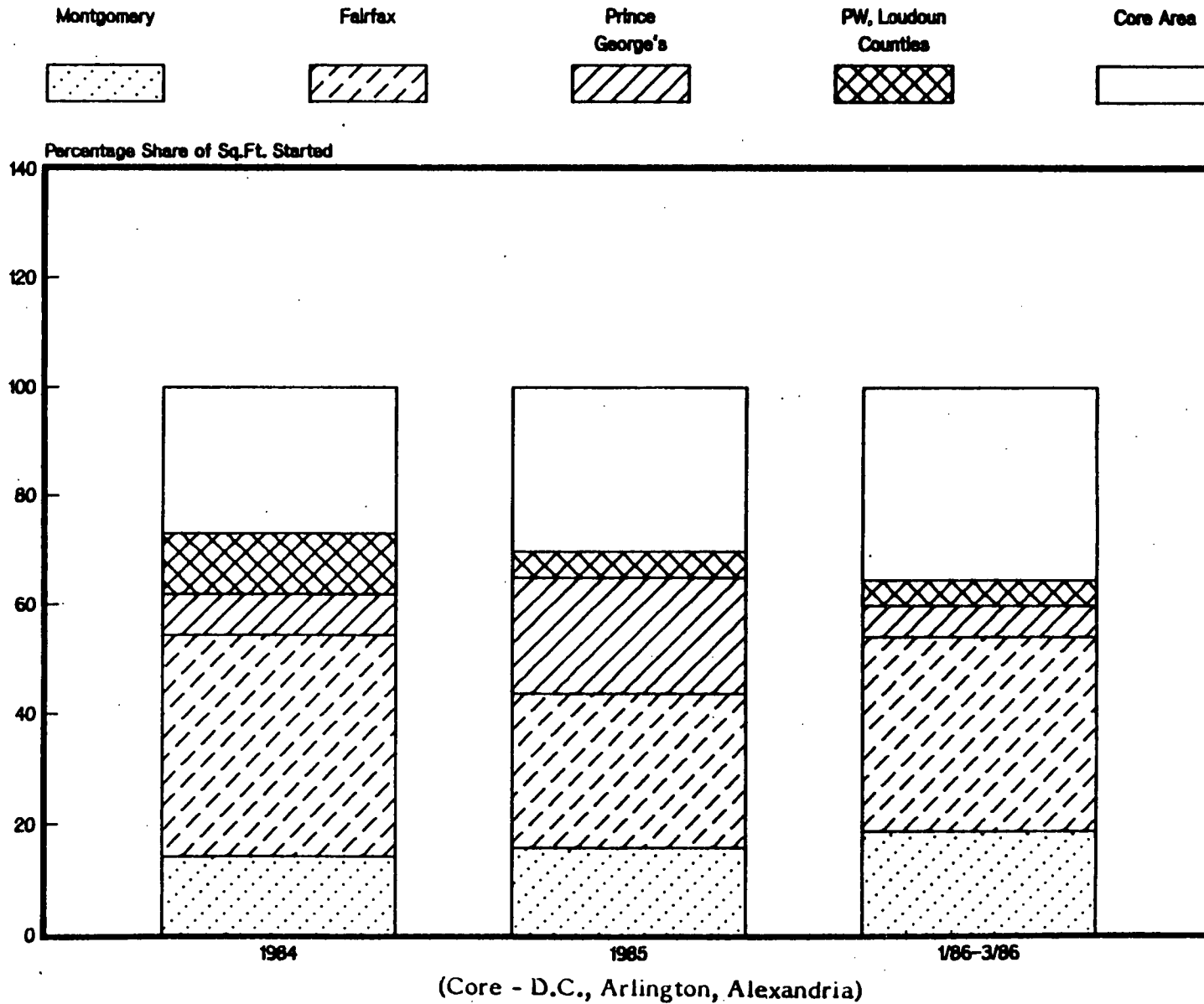
Industrial completions in both 1984 and 1985 were at record levels in Montgomery County. Area-wide occupancy of industrial/warehouse space during the 1980's has kept pace with construction since the majority of this space is "built to suit." The area occupancy rate for industrial space was 90 percent in 1984 and as recently as 1982 stood at 98 percent. When fully occupied, a density of 500 square feet per employee is found in such buildings.

In comparison, retail construction in Montgomery County has been more moderate. In 1985, 395,546 square feet of retail space was completed, only 5 percent greater than the level recorded in

Exhibit 2

PERCENTAGE SHARE OF NON-RESIDENTIAL BUILDING

STARTS FOR THE WASHINGTON REGION, 1/84-3/86



Source: Metropolitan Washington Council of Governments, Commercial Construction Indicators Series.

1979. Occupancy of area shopping centers is reported at 98 percent, with a density of approximately 400 square feet per employee. This satisfactory occupancy rate largely can be attributed to a national slowdown in construction of major regional shopping centers occasioned by overbuilding experienced during the 1970's. The Lakeforest Mall, which opened in 1978, is the most recently completed regional facility in Montgomery County.

5. Policy Area Forecast

Table 4 and Exhibit 3 show estimated net employment gain in the County's Policy Areas. A map of the Policy Areas is presented below. The leaders of employment growth are concentrated in the I-270 Corridor, Bethesda, and Silver Spring. The employment base in Gaithersburg East and West is projected to have a net increase of a total of nearly 6,000 jobs. Employment in Bethesda and Silver Spring/Takoma Park taken together is forecast to grow by more than 5,000 jobs. Much of the growth, particularly in Bethesda, Silver Spring, and Rockville is Metrorail-centered. Policy Areas which are forecast to experience only small employment gains include Olney, Germantown East, and Kensington-Wheaton. Little or no economic growth is expected for Cloverly and Damascus.

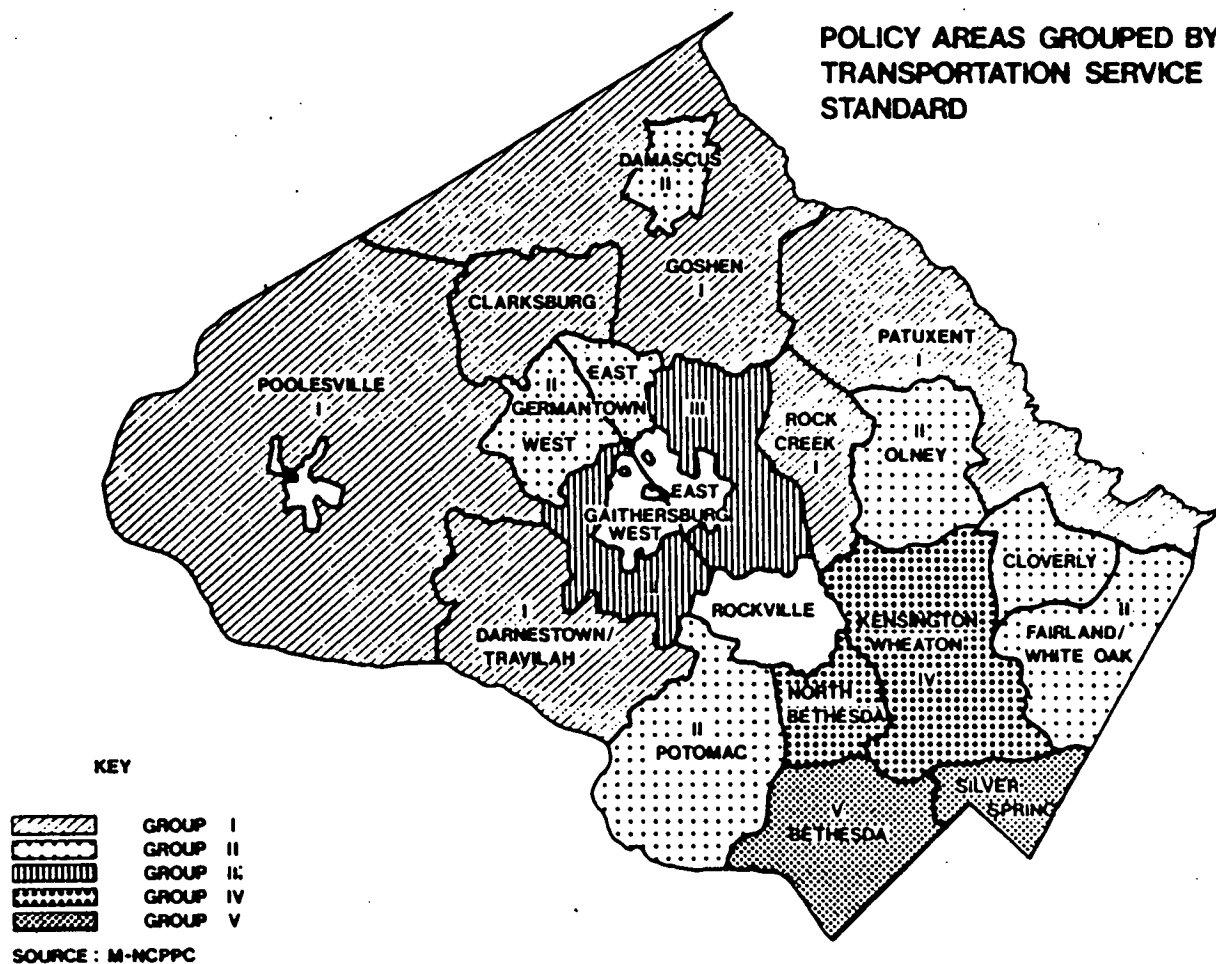


Table 4.

INTERMEDIATE EMPLOYMENT FORECAST
BY POLICY AREA

Policy Areas	Existing Jobs Esti- mated July 1986	Percent Share	Net New Jobs FY 87 and FY 88	Percent Share of Net New Jobs
Rockville	42,100	11.5	4,700	20.9
Rural Area*	<u>7,300</u>	<u>2.0</u>	<u>300</u>	<u>1.3</u>
GROUP I POLICY AREAS	49,400	13.5	5,000	22.2
Damascus	1,300	.4	60	.3
Olney	3,700	1.0	160	0.7
Germantown West	5,800	1.6	710	3.1
Germantown East	2,100	.6	330	1.5
Cloverly	800	.2	10	0
Potomac	11,900	3.3	790	3.5
Fairland/White Oak	<u>23,000</u>	<u>6.3</u>	<u>940</u>	<u>4.2</u>
GROUP II POLICY AREAS	48,600	13.3	3,000	13.3
Gaithersburg East	42,300	11.5	3,840	17.1
Gaithersburg West	<u>16,000</u>	<u>4.4</u>	<u>1,960</u>	<u>8.7</u>
GROUP III POLICY AREAS	58,300	15.9	5,800	25.8
North Bethesda	54,500	14.9	3,200	14.2
Kensington/Wheaton	<u>36,800</u>	<u>10.1</u>	<u>200</u>	<u>0.9</u>
GROUP IV POLICY AREAS	91,300	25.0	3,400	15.1
Bethesda	77,400	21.2	2,600	11.6
Silver Spring/Takoma Park	<u>40,800</u>	<u>11.1</u>	<u>2,700</u>	<u>12.0</u>
GROUP V POLICY AREAS	118,200	32.3	5,300	23.6
TOTAL COUNTY	<u>365,800</u>	<u>100.0</u>	<u>22,500</u>	<u>100.0</u>

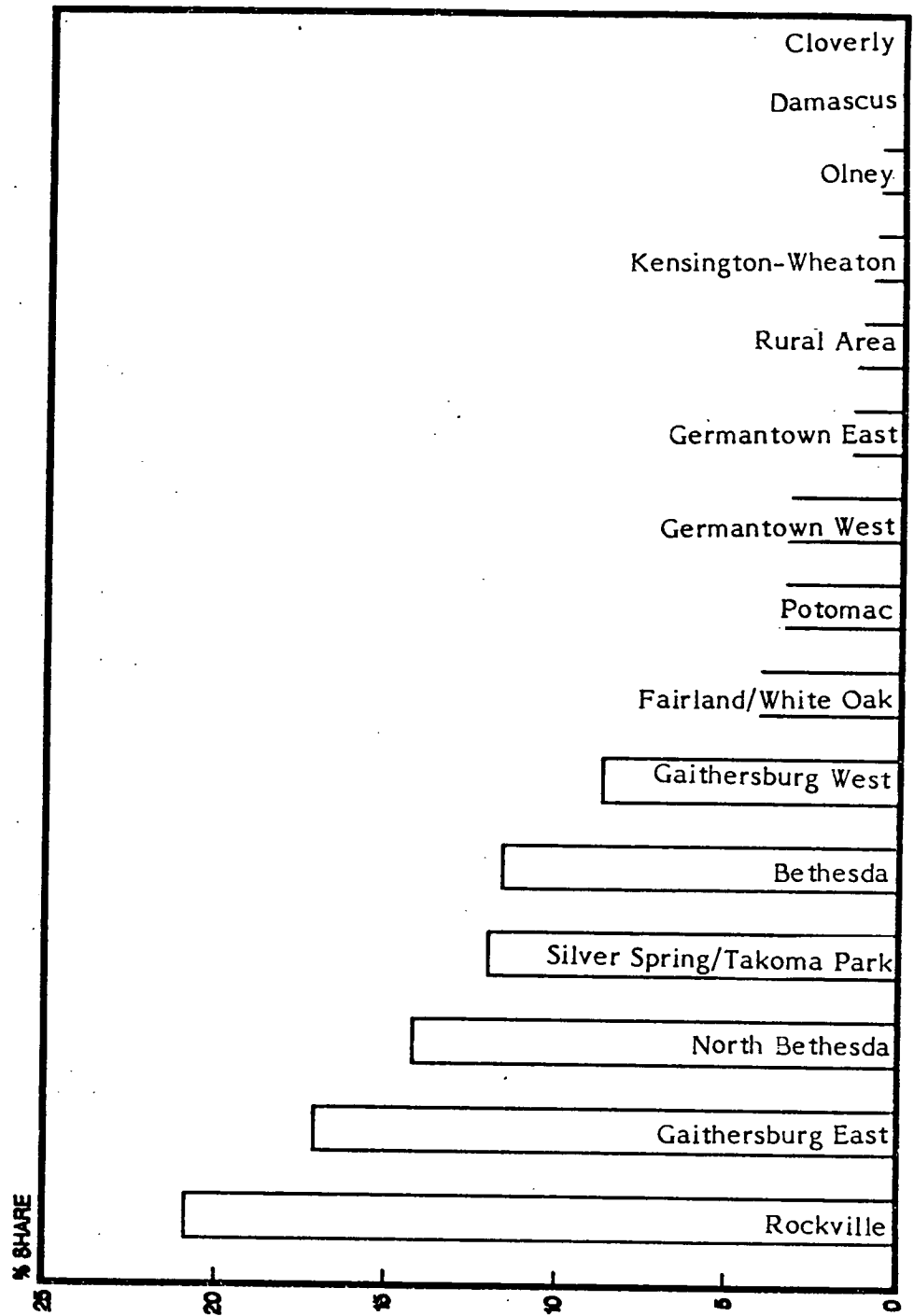
* Rural area includes Travilah, Darnestown, Clarksburg, Poolesville, Goshen, Rock Creek and Patuxent.

Source: Research Division, Montgomery County Planning Department.

Exhibit 3

FY 87-88 INTERMEDIATE EMPLOYMENT FORECAST

BY POLICY AREA



Source: Research Division, Montgomery County Planning Department

6. Summary of Employment Forecast

Montgomery County's economy is forecast to remain strong, adding between 13,000 and 34,000 net new jobs during the next two fiscal years depending on absorption rates, employee densities, national and international monetary and fiscal policy, tax reform legislation, and Gramm-Rudman-Hollings legislation. The majority of this growth will occur in space which is new or near completion. A number of factors are stimulating local economic expansion including:

- A large supply of new, attractive, and accessible commercial and industrial space ready for immediate occupancy at favorable leasing rates. This commercial/industrial inventory attracts businesses from outside and inside the region to locate in the County. It also provides space for existing businesses to expand or for new firms to start. The loss of strong, current tax incentives could dramatically reduce the amount of new space started over the next few years. But the County has the advantage of a large inventory of high quality, new office space which will accommodate a couple of years of strong growth even without new construction starts.
- The local economy is made up, in large part, of high growth industries. The service sector, which makes up over 40 percent of total County employment, predominantly in high paying business and professional services, is rapidly growing both nationally and locally. The County's high income and recent rapid housing growth should fuel continued expansion of the retail trade and personal services sectors.
- Direct access to the nation's capital and the high technology federal government presence in the County attract many contractors, particularly those in defense systems, satellite communications, biotechnology, and data processing. These contractors make up a rapidly growing part of our economy. The potential constraints represented by the Gramm-Rudman-Hollings budget cuts are expected to reduce this growth rate but not the total size of this sector.

C. Housing Production Outlook For FY 87 and FY 88

1. Montgomery County Forecast

Montgomery County is experiencing its strongest housing construction boom in over 20 years, as depicted in Exhibit 4. The current housing production upturn began in 1983, following the 1981-1982 recession, when housing completions rose to 6,150 units from approximately 3,500 units in 1982. The 1983 total of 6,150 units was the highest annual completion rate recorded since 1974. In 1984 and 1985, housing completions continued to increase to 8,400 and 9,800, respectively.

The intermediate housing forecast for FY 87 projects 10,500 units, but may, in fact, range from a low of 9,000 to a high of 12,000 units, as shown in Table 5. FY 87 is likely to be the peak year of the current housing cycle, although from a historical perspective, housing production is expected to remain at a high level. For FY 88, the intermediate forecast assumes a moderate decline to 9,500, with a possible high of 11,000 and a low of 8,500.

Table 5.

MONTGOMERY COUNTY HOUSING COMPLETION FORECAST, FY 87 and FY 88 (Number of New Dwelling Units)

	FY 87	FY 88	Total FY 87 and FY 88
High (maximum foreseeable)	12,000	11,000	23,000
INTERMEDIATE (most probable)	10,500	9,500	20,000
Low (minimum foreseeable)	9,000	8,500	17,500

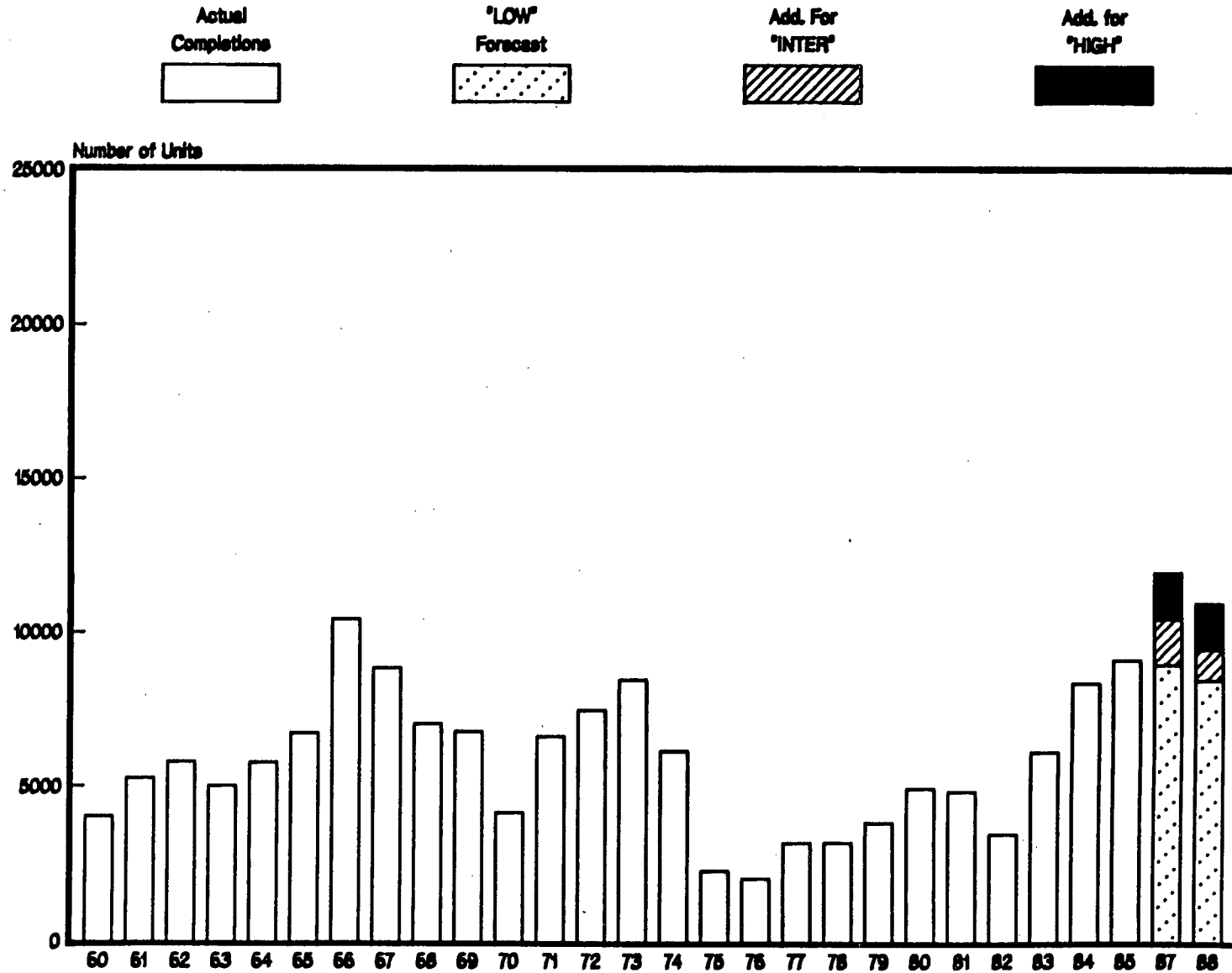
Source: Research Division, Montgomery County Planning Department.

This forecast was derived from a "top down" review of national and regional trends and a "bottom up" analysis of recent Montgomery County housing development activity, such as housing completions by sub-areas of the County, building permits, sewer authorizations, and preliminary plans.

The "top down" assessment includes a review of published economic and demographic materials, as well as personal interviews with national experts headquartered in the Washington region. The following persons were interviewed:

Exhibit 4 MONTGOMERY COUNTY HOUSING UNIT COMPLETIONS

(1960-85 Calendar Actual, FY87 & FY88 Forecast)



FOR THE FORECAST, TOTAL BAR IS HIGH FORECAST

- Michael Sumichrast, Chief Economist, National Association of Homebuilders
- Duane McGough, Senior Housing Economist, Department of Housing and Urban Development
- Warren Lasko, President, Mortgage Bankers Association

All three of the above expect mortgage interest rates to remain at or below their currently attractive level for the next two years, and possibly longer. Market and demographic trends suggest the increasing importance of a trade-up sales market for single-family housing. Multi-family rental production losses caused by cutbacks in revenue bond financing are likely to be offset by increased conventional lending for such rentals. Single-family production should be sufficient to offset any possible reduction in multi-family production. Consistent with the judgments expressed by these experts, the Research Division has forecast FY 87 as the peak year of the current housing boom.

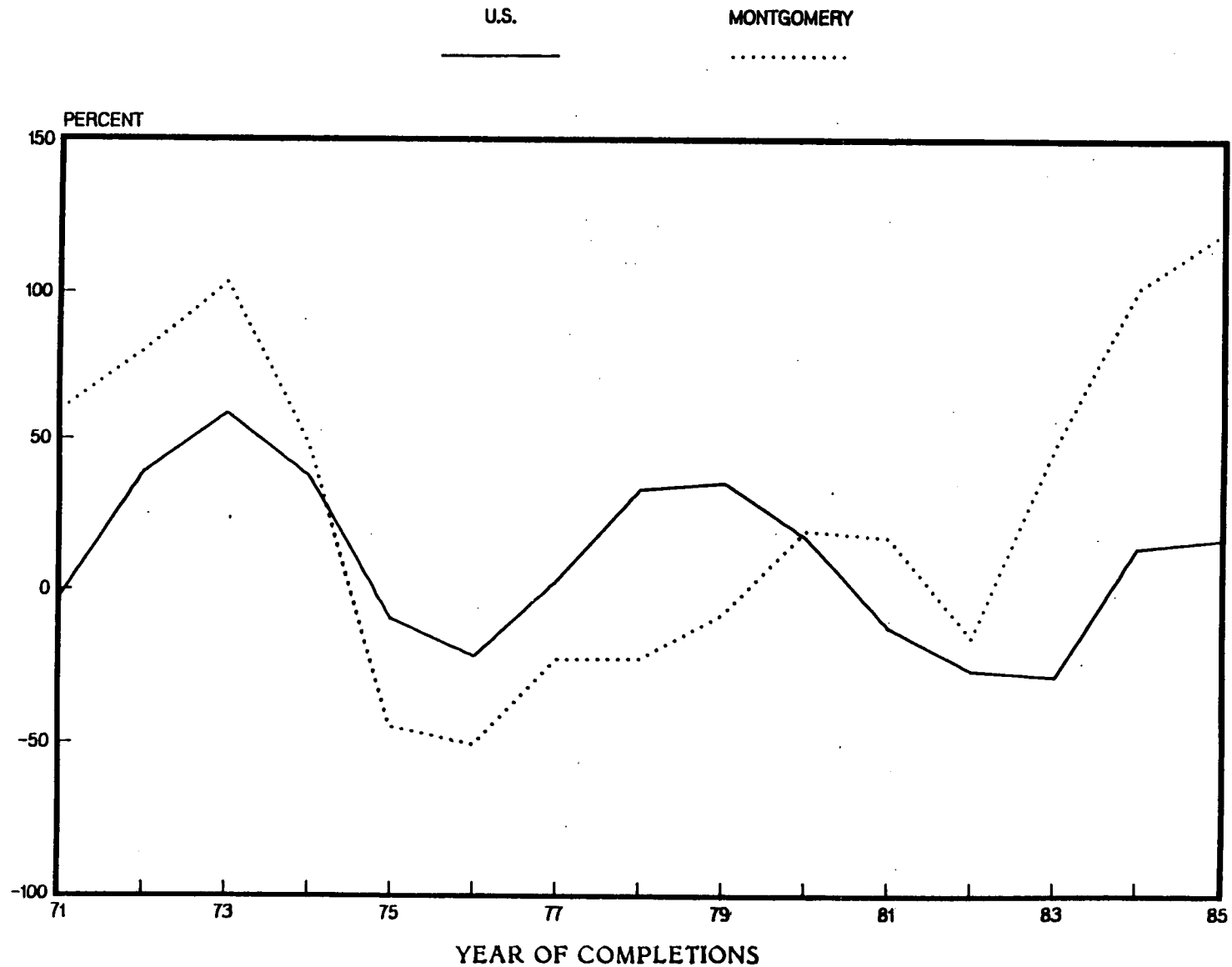
The County's housing production cycles have corresponded fairly closely with those of the nation, as shown in Exhibit 5. National housing production cycles react to general economic conditions and the availability and cost of mortgage financing. Demographic trends, such as changes in household formation rates, shifts in the population age profile, birth rates, and household income, also affect housing demand.

Regional and local economic employment trends also exert important pressures on the local housing market. The Washington region enjoys one of the lowest unemployment rates among the larger metropolitan regions in the nation. This is due, in part, to the presence of the federal government. Federal employment has remained relatively stable after minor attritional losses in 1981 and 1982. In addition, a rapidly expanding defense effort has stimulated local contractor growth. The region's strategic function as a national association and lobbying headquarters and international service and communications center also has created numerous highly paid, professional jobs. The area's high income levels and generally high quality of life rank it among the "hottest" homebuilding markets in the country. Within the Washington metropolitan area, Montgomery County is recognized as a preferred location for both housing and business activity.

Environmental and infrastructure limitations have also influenced housing growth in Montgomery County. The sewer moratoria of 1971-1975 curtailed residential development in many parts of the County causing the County's share of the region's residential building permits to reach its lowest point in the past 16 years.

A useful index to measure Montgomery County's residential growth attractiveness is its relative share of total regional building permit activity over the past 16 years. As shown in

Exhibit 5
HOUSING COMPLETIONS IN MONTGOMERY COUNTY & US
PERCENT CHANGE FROM 1970



Source: Research Division, Montgomery County Planning Department and U.S. Department of Housing and Urban Development, HUD Statistical Yearbook.

Exhibit 6, the County's share of regional building permit activity has fluctuated greatly but has stood at record levels in recent years. In 1985, Montgomery County accounted for nearly 37 percent of regional residential building permit activity.

During the 1980's, building permit levels declined rapidly in the Core area (Washington, D.C., Arlington, and Alexandria). These areas had largely been developed in the previous decade with high density uses, including high rise condominiums targeted to mature, childless couples. With the extension of Metrorail routes and improved highway access, outlying areas of the region became more accessible and attractive, particularly to the baby boom generation with strong preferences for "starter" single-family housing.

Table 5A shows the interest rate assumptions which were used in developing the forecast range. Other important factors used in forecasting the range of housing completions over the next two fiscal years are summarized below.

Table 5A.

Contract Mortgage Rates
(Fixed Term, 15+ Years)

Current*	High Forecast	Intermediate Forecast	Low Forecast
9.7 to 11.4%	9 to 10%	10 to 11% (same as now)	11 to 12%

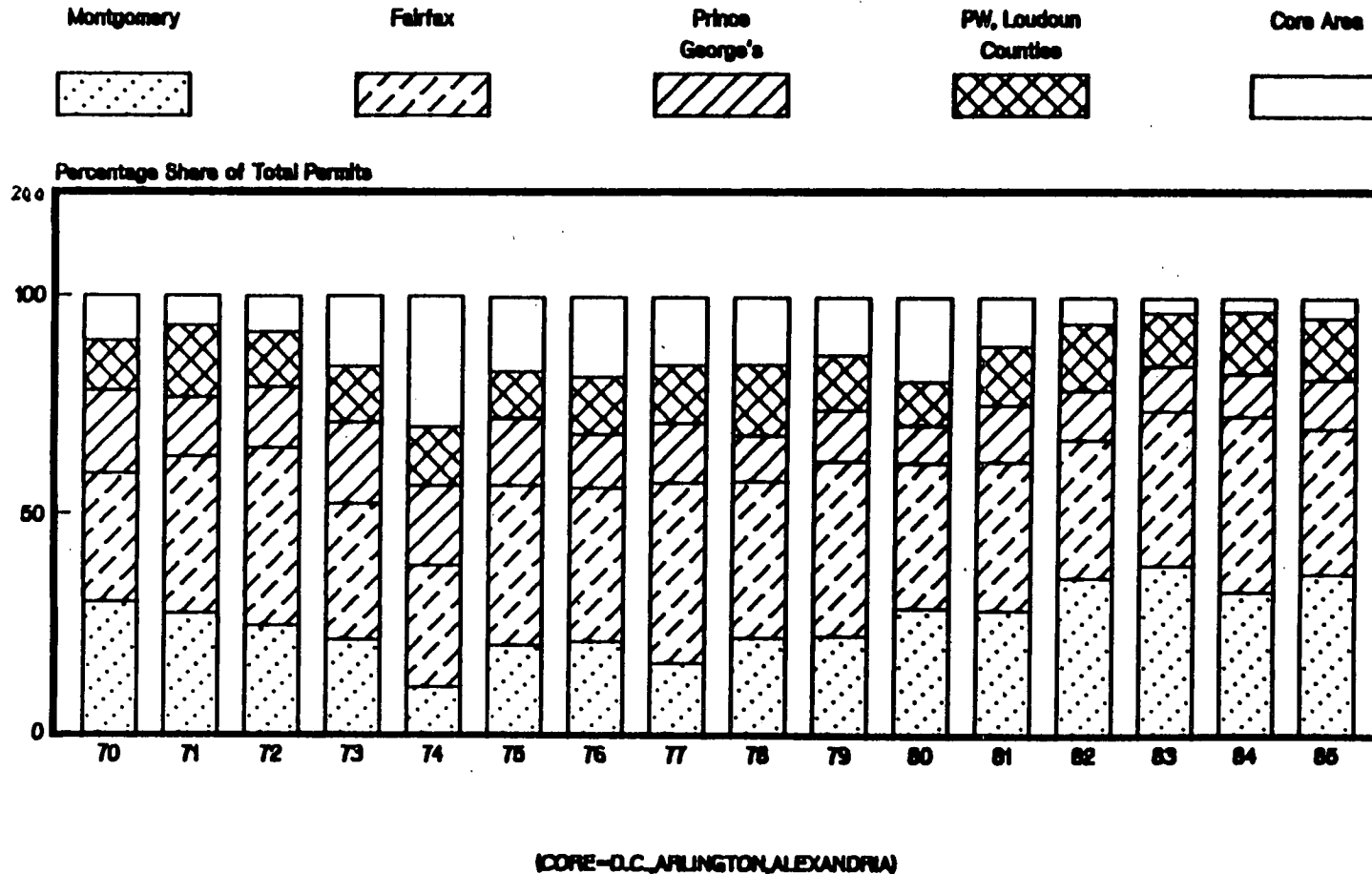
* Range of current contract rates as reported by The Federal Home Loan Bank Board between early December 1985 to early May 1986. May 1986 rate was 9.7%.

- The High Forecast is premised upon an optimistic assessment of the homebuying market and interest rates, with burgeoning importance of the trade-up sector. Multi-family rental housing production is assumed to maintain present or moderately higher levels, supported by minimal adverse federal tax reform constraints and also by anticipated increases in private mortgage financing of rental housing.
- The Intermediate Forecast assumes a continuing high level of regional and local employment; stability or even a modest decline in home mortgage interest rates; a continuing, strong homebuying market; but a moderate decline in multi-family rental housing production resulting from federal tax reform constraints on tax-exempt revenue bond financing for multi-family rentals.

Exhibit 6

% SHARE OF RESIDENTIAL BUILDING PERMITS

FOR THE WASHINGTON REGION, 1970-1985



Source: Metropolitan Washington Council of Governments, Metro Area Residential Building Permit Authorizations, 75-83; Development Review Division, Montgomery County Planning Department; U.S. Department of Commerce, C-40 Reports; and Department of Environmental Protection, Montgomery County, 1983-1985.

- The Low Forecast assumes moderately decreased home-buying strength caused by reduced demand for starter homes among a maturing "baby boom" generation; possible unanticipated, adverse consequences of to-be-enacted federal tax reform legislation; and potential international political and financial changes which might substantially diminish foreign capital investments in the United States and cause interest rates to rise. It also assumes significant reductions in the use of revenue bond financing for multi-family rentals, with only limited, offsetting private mortgage market support for such rental housing production.

Unlike the intermediate employment forecast, which shows lower employment growth in FY 87 than in FY 86, the housing intermediate forecast assumes that housing production will increase in FY 87 over FY 86 levels. Although regional employment and housing growth are closely related over the long-term, on an annual basis, variations in County growth trends are common. Our more bullish housing assumption is based upon the relative attractiveness of Montgomery County as compared to the region. As regional traffic congestion increases, more of our existing workers in the County will choose to live here.

In comparison to historic trends, the "low" forecast assumes a high level of housing production through FY 88. The Research Division believes that market conditions are such that even if employment gains drop sharply, housing demand will continue at high levels. Interviews with housing experts indicate that while interest rates may move upward to a high of 12 percent, they will remain below the high levels of recent years. In addition, there is strong trade-up demand from recently formed baby boom households.

Both Montgomery and Fairfax Counties have emerged as preferred housing locations in the Washington, D.C. metropolitan area. The 1984 Census Update Survey showed that 60 percent of Montgomery County residents work in the County. This ratio has risen steadily over the past 20 years and is expected to continue this trend in the future.

2. Policy Area Housing Forecast

At the Policy Area level, the Intermediate Two-Year Forecast predicts that Germantown West, Gaithersburg East, and Fairland/White Oak are the largest gainers of residential development. Combined housing production in these areas is expected to total approximately 9,000 dwelling units, or more than 44 percent of total expected County housing production. Other rapidly growing areas include Gaithersburg West and Kensington/Wheaton. Two-year gains of 600 units or less each are forecast for the Cloverly, Bethesda, Damascus, and Silver Spring Policy Areas. Table 6 and Exhibit 7 show the Intermediate Forecast by Policy Area.

Table 6.

INTERMEDIATE HOUSEHOLD GROWTH BY POLICY AREA

Policy Areas	Estimated FY 85 and FY 86*		Forecast FY 87 and FY 88	
	Dwelling Unit Growth	Percent Share	Dwelling Unit Growth	Percent Share
Rockville	300	1.6	300	1.5
Rural Area**	<u>920</u>	<u>5.0</u>	<u>900</u>	<u>5.5</u>
Group I Policy Areas	1,220	6.6	1,200	7.0
Damascus	200	1.1	300	1.5
Olney	825	4.5	900	4.5
Germantown West	2,190	11.8	3,250	16.3
Germantown East	1,580	8.5	1,050	5.2
Cloverly	545	2.9	600	3.0
Potomac	930	5.0	1,150	5.7
Fairland/White Oak	<u>3,070</u>	<u>16.6</u>	<u>2,900</u>	<u>14.5</u>
Group II Policy Areas	9,340	50.5	10,150	50.7
Gaithersburg West	1,945	10.5	2,100	10.5
Gaithersburg East	<u>3,240</u>	<u>17.5</u>	<u>3,000</u>	<u>15.0</u>
Group III Policy Areas	5,185	28.0	5,100	25.5
North Bethesda	460	2.5	750	3.7
Kensington/Wheaton	<u>1,675</u>	<u>9.1</u>	<u>1,900</u>	<u>9.5</u>
Group IV Policy Areas	2,135	11.5	2,650	13.2
Bethesda	320	1.7	600	3.0
Silver Spring/Takoma Park	<u>300</u>	<u>1.6</u>	<u>300</u>	<u>1.5</u>
Group V Policy Areas	620	3.4	900	4.5
TOTAL COUNTY	<u>18,500</u>	<u>100.0</u>	<u>20,000</u>	<u>100.0</u>

* Estimate based on actual completions in FY 85 and the 3rd and 4th quarters of calendar 1985.

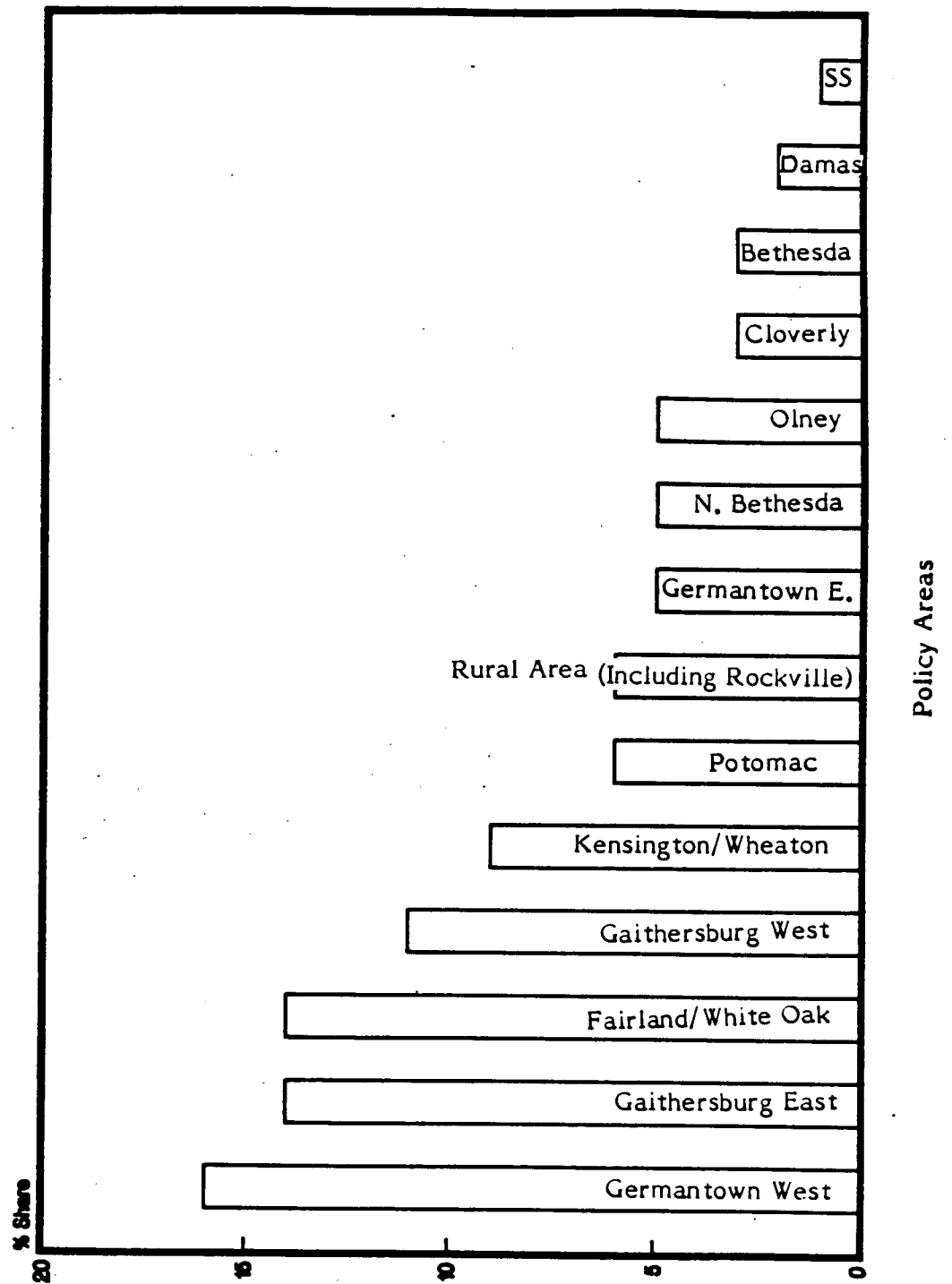
** Rural area includes Travilah, Darnestown, Clarksburg, Poolesville, Goshen, Rock Creek and Patuxent.

Source: Research Division, Montgomery County Planning Department.

Exhibit 7

FY87 & FY88 INTERMEDIATE HOUSING FORECAST

BY POLICY AREA



Source: Research Division, Montgomery County Planning Department.

The distribution of dwelling units among Policy Areas in the Intermediate FY 87 and FY 88 forecast is very similar to the estimated distribution which occurred in the FY 85 and FY 86 period. The noticeable difference in these growth figures is a minor shift of production from Group II and III Policy Areas (Germantown and Gaithersburg) to Group IV and V (down-County areas).

3. Summary of Housing Forecast

A combination of economic, demographic, and geographic factors has fueled the current local housing boom in Montgomery County. These factors include:

- Sharp reductions in mortgage interest rates have substantially reduced the debt service (principal and interest) burden for prospective homebuyers and have, accordingly, strengthened homebuying demand. A reduction from last year's 13 percent level to the current 10 percent would, illustratively, translate itself into a \$7,850 affordability gain for the purchase of a \$100,000 home with an \$80,000, 30-year mortgage. Using the 28 percent debt/income ratio of the Federal National Mortgage Association (FNMA), the estimated monthly principal, interest, taxes and insurance premium (PITI) payment for the above \$80,000 mortgage would require a \$43,740 annual household income at 13 percent interest; at the 10 percent rate, only \$35,889 is required. This reduction increases the market potential in Montgomery County by 25,000 additional households, or 10.6 percent of nearly 236,000 County households.

The market-boosting effects of reduced interest rates have benefited both first-time and trade-up new home purchasers. They also have supported the existing home resale market, a prerequisite corollary for a strong trade-up new home market, because resales release equities for new home purchase.

- A healthy and growing regional and local economy (low unemployment and high annual incomes) attracts in-migrants and new labor force entrants to satisfy new job growth.
- Strong demand from the County's and region's maturing "baby boomers" who are enjoying rising incomes, thus creating a greater demand for trade-up housing with more amenities. They also are increasing their family size, thus demanding larger rental and sale units.
- A sufficient supply of land, already approved and available for development in Montgomery County.

D. The Development Pipeline

1. The Local Development Process

The Montgomery County Government requires land development to adhere to a local development review and approval process to ensure orderly growth and implementation of the County's General Plan and the respective Planning Area master plans. Montgomery County's development process consists of several steps, including the following:

- Determination of zoning classification;
- Determination of water and sewer service classification;
- Approval of preliminary subdivision plan;
- Authorization of water and sewer service;
- Recording of preliminary subdivision plan;
- Provision of necessary physical infrastructure;
- Issuance of building permit;
- Construction and inspection; and
- Completion.

Typically, the County initiates the first two steps of this process: the determination of zoning and water and sewer service classification(s), which establish where and how much development is appropriate. These are accomplished for all land in the County regardless of the land owner's intentions concerning its future use. For the process to continue, the developer must initiate the remaining development steps, and in so doing make his intentions known to the Montgomery County Planning Board and other County Government entities.

The County's development process generally occurs in a prescribed sequence. For example, preliminary plan approval is required prior to record plat approval. In addition, with the exception of an isolated single-family house, a plat must be recorded before a building permit is issued.

Generally, a sewer authorization is obtained within 90 days of preliminary plan approval, although a subdivision may be recorded prior to sewer authorization. Once granted, a sewer authorization is valid for the life of a preliminary plan. A preliminary plan has a limited life. If it is not recorded within three years of its approval or granted an extension by the Planning Board, the plan expires. Once a plan is recorded, it is considered a permanent subdivision which only can be altered by an approved, alternative preliminary plan and record plat for the same land.

2. An Assessment of Development Activity over the Past Decade

At any one given time, the land development process consists of a number of private sector building plans which have reached various phases of the approval and development process. This is

similar to a manufacturing process in which a number of widgets are found at various stages of production at any one moment.

A cross-sectional picture of development activity over a year's time provides a view of each development phase. This is a static view which does not show the dynamics of individual projects moving through the system. While a record plat approved this year is likely to have been a preliminary plan approved last year, this is not always the case since a developer has up to three years to record a preliminary plan. Each step indicates how much development was approved at that stage no matter when the prior step was accomplished.

Preliminary plan approval is the key step in the process. It is at this point where a determination is made as to the adequacy of local public facilities. An approved preliminary plan is required to meet only those conditions which are placed upon it at the time of approval. Consequently, unbuilt approved preliminary plans comprise the inventory of vacant land which can proceed to construction without further APF testing.

As shown in Table 7, there were some 46,600 dwelling units and non-residential floor space that could accommodate an estimated 84,500 employees in approved but unbuilt preliminary plans in Montgomery County as of April 30, 1986. These counts include all approved plans regardless of whether sewer authorization has been obtained. The total comprises approved preliminary plans without sewer authorizations in addition to approved preliminary plans with sewer authorizations. Those approved preliminary plans with sewer authorizations which were approved more than three years ago must be recorded to maintain their approved status.

Table 7.

DEVELOPMENT
As of April 30, 1986

	Existing As Of July 1986	Approved Preliminary Plans
Number of Housing Units	252,000	46,600
Number of Employees	365,800	84,500*

* That could be accommodated in approved non-residential floor space.

Source: Research Division, Montgomery County Planning Department.

Nearly 44,000 of the 46,600 housing units have sewer authorizations. In comparison to 1984, this is a 2,100-unit, or 4 percent, reduction in the number of approved residential subdivision plans with sewer authorizations. This reduction was caused by a greater number of units moving from an authorized status to completion than were newly added to the authorization list. Effectively, the local building industry is using up its inventory of approved lots to meet current strong market demand. In addition, the approval of new preliminary plans has been greatly restricted by the lack of adequate public facilities in growth areas of the County.

Table 8 shows the number of unbuilt dwelling units and employees in approved preliminary plans by Policy Area. These numbers actually change weekly as the Planning Board takes action on subdivision plans. The current 46,600 pipeline dwelling units represent the inventory of potential residential development in Montgomery County. If current market conditions continue, this pipeline equates to five-plus years of residential development. As such, it is the smallest pre-construction inventory for any year over the past five years when the present rate of growth is considered.

3. 1984 and 1985 Development Activity

Table 9 provides a summary of development activity during calendar years 1984 and 1985. The 5,772 housing units contained in preliminary plans approved in 1985 were less than 60 percent of the number approved in 1984. As noted above, this reduction can be attributed largely to APFO limits and should not be viewed as a loss of developer interest or an indicator of reduced housing market demand.

A short term demand indicator, the number of building permits issued in the County, stands at more than 9,600 units in 1985. This is about 8.5 percent greater than the 1984 level of nearly 8,900 units. In addition, 1985 housing completions were 15.7 percent greater than the 1984 level. Table 10 shows 1984 building permit and completion data by Policy Area.

Table 8.

MONTGOMERY COUNTY DEVELOPMENT PIPELINE

Approved Preliminary Plans¹

	Number of Dwelling Units	Number of Employees
Damascus	944	630
Olney	3,096	1,142
Germantown West	7,776	4,028
Germantown East	1,570	1,851
Cloverly	1,475	199
Potomac	2,496	1,430
Fairland/White Oak	8,125	6,325
GROUP II POLICY AREAS	25,482	15,605
Gaithersburg West	5,676	9,952
Gaithersburg East	7,499	15,427
GROUP III POLICY AREAS	13,175	25,379
North Bethesda	2,365	16,432
Kensington/Wheaton	4,607	3,466
GROUP IV POLICY AREAS	6,972	19,898
Bethesda	747	15,673
Silver Spring/Takoma Park	278	7,938
GROUP V POLICY AREAS	1,025	23,611
TOTAL COUNTY	46,654	84,493

¹ Unbuilt approved preliminary plans as of April 30, 1986.
Includes approved preliminary plans both with and without
sewer authorizations.

Source: Research Division, Montgomery County Planning
Department, Sales Transaction Automated Report.

Table 9.

MONTGOMERY COUNTY DEVELOPMENT REPORT
(Number of Permits and Actions Processed)
Calendar Year 1984

	<u>Single-Family</u>		Apart-	Total
	Detached	Town-	ment	Dwelling
	Units	house	Units	Units
		Units		
RESIDENTIAL				
Sewer Authorizations Issued	2,273	1,522	1,664	5,459
Preliminary Plans Approved	4,302	4,150	1,523	9,975
Plats Recorded	3,868	3,097	790	7,755
Building Permits Issued ¹	--	--	--	8,879
Completions	3,023	3,604	1,773	8,400
COMMERCIAL AND INDUSTRIAL				
Sewer Authorizations Issued	3.4 Million Sq. Ft.- Gross Floor Area			
Completions	4.8 Million Sq. Ft.- Gross Floor Area			

Calendar Year 1985

RESIDENTIAL				
Sewer Authorizations Issued	2,084	2,390	2,535	7,009
Preliminary Plans Approved	2,102	2,695	1,027	5,772
Record Plats Approved	3,955	3,800	1,698	9,453
Building Permits Issued ¹	--	--	--	9,642
Completions	3,463	4,095	2,234	9,798
COMMERCIAL AND INDUSTRIAL				
# of Preliminary Plans Approved	52			
# of Record Plats Approved	47			
Completions	6.0 Million Sq.Ft.-Gross Floor Area			

¹ Obtained from a computer program which reads Department of Environmental Protection records. This number is significantly lower than previously published numbers in Census Bureau C40 Reports.

Source: Research Division, Montgomery County Planning Department.

Table 10

BUILDING PERMITS FILED
IN MONTGOMERY COUNTY
(Number of Dwelling Units)

HOUSING COMPLETIONS
IN MONTGOMERY COUNTY
(NUMBER OF DWELLING UNITS)

	1/84-12/84	1/85-12/85	
<u>POLICY AREA</u>	<u>TOTAL</u>	<u>TOTAL</u>	<u>CHANGE</u>
DAMASCUS	155	83	-72
OLNEY	455	643	188
GERMANTOWN WEST	1,218	1,432	214
GERMANTOWN EAST	642	480	-162
CLOVERLY	371	309	-62
POTOMAC	497	411	-86
FAIRLAND/WHITE OAK	1,200	1,485	285
GAITHERSBURG WEST	843	768	-75
GAITHERSBURG EAST	1,227	801	-426
NORTH BETHESDA	220	183	-37
KENSINGTON/WHEATON	879	842	-37
BETHESDA	148	117	-31
SILVER SPRING/TAKOMA PARK	124	139	15
OTHER*	901	1,949	1,048
COUNTY TOTALS	8,879	9,642	763

	1/84-12/84	1/85-12/85	
<u>POLICY AREA</u>	<u>TOTAL</u>	<u>TOTAL</u>	<u>CHANGE</u>
DAMASCUS	176	91	-85
OLNEY	365	421	56
GERMANTOWN WEST	1,717	1,011	-706
GERMANTOWN EAST	299	909	610
CLOVERLY	311	285	-26
POTOMAC	435	485	50
FAIRLAND/WHITE OAK	2,442	1,641	-199
GAITHERSBURG WEST	774	1,027	286
GAITHERSBURG EAST	1,005	1,813	808
NORTH BETHESDA	222	220	-2
KENSINGTON/WHEATON	1,072	871	-201
BETHESDA	105	236	131
SILVER SPRING/TAKOMA PARK	130	131	1
OTHER*	418	657	239
COUNTY TOTALS	8,471	9,798	1,327

*Includes Rockville, Group I Policy Areas, and unlocated permits.

*Includes Rockville and Group I Policy Areas.

CHAPTER II: AN ASSESSMENT OF CURRENT AND NEAR-TERM PROJECTED LEVEL OF SERVICE CONDITIONS

A. Measures of Transportation Level of Service

The carrying capacity of the County's transportation system is measured by means of a "Level of Service" (LOS) indicator. This indicator is used in two different ways: (1) to measure the specific condition at a particular intersection or segment of a road, and (2) to measure the average condition over an area that includes many intersections and road segments. The methods used to measure LOS at an intersection or segment are more easily understood than those used to measure average LOS over an area. Because this Interim Growth Policy uses the average LOS concept as an important building block in its analysis, the methods used to calculate this measure warrant explanation. All the methods used in this report are extensions of the methods used in previous Comprehensive Planning Policy reports prepared by the Planning Department.

1. Intersection Level of Service

The concept of intersection or roadway LOS has been used by the transportation engineering profession since the early 1950's. It basically has been a qualitative measure of how well an intersection or roadway is operating; as such it is a separate concept from capacity which is a quantitative measure of traffic flow. Definitions and measurement criteria have been established to distinguish among the different levels of LOS. An easily recognizable way to distinguish among these levels has been to use "letter grades" ranging from A to F which are analogous to the letter grading systems familiar to students. In this measurement scale, the LOS A is associated with conditions of least congestion and a generally free flowing traffic with safe operating speeds. At the other end of the measurement scale is LOS F which is associated with conditions that represent stop-and-go congested traffic, where there are often forced flow situations and traffic back ups. For a roadway segment, the greatest traffic flows occur at LOS E which is considered as the maximum capacity.

The particular intersection LOS measurement technique used by the Planning Board has been that of the Critical Lane Volume method. This particular technique is outlined in the Comprehensive Planning Policies Report document, as is the particular measurement scale which distinguishes among the different LOS categories. That technique is used in assessing LOS conditions in the Local Area Traffic Reviews performed for subdivision cases. The reader should refer to that publication for additional detail.

2. Average Level of Service for an Area

The Planning Board and staff have used the concept of average LOS since it was introduced in the 1979 Comprehensive Staging Plan proposal. Briefly, it was developed as follows.

The County has been divided into a number of policy areas which have been used as the geographic units for which average LOS conditions for each area is determined. These policy areas are further organized into five groups based upon the degree of public transportation service available to them. These groups have been subsequently related to the average roadway congestion experienced in those areas. From the point of view of travelers in the County, they usually experience several different LOS conditions at different parts of their trip. Consequently, most people tend to view LOS as an average over many roadway segments and intersections. By comparing observed or forecasted traffic volumes on individual roadway segments to the capacity of those roadways, a quantitative indicator or ratio associated with particular LOS conditions is obtained. These ratios can then be aggregated and averaged to describe conditions for an entire area, such as the policy areas. The resulting measure is seen as being more representative of the cumulative conditions experienced by many travelers across the entire area.

3. Standards of Acceptability for Average LOS

Five classes of transit service have been used to group policy areas for the purpose of defining LOS standards, or norms, for roadway congestion. Exhibit 8 shows the particular combination of policy areas in accordance with these groups and indicates the acceptable LOS standard for each group. These are the same transportation service standards, or norms for average LOS conditions, which have been used by the Planning Board in setting thresholds in the Comprehensive Planning Policies Report. These standards are based upon an acceptance of a policy correlation between transit availability and average LOS on the roadway network. It has been reasoned that as transit service standards decline average roadway congestion standards which are used should provide for less congested LOS conditions. Conversely, as transit service standards increase, roadways, on the average, should be allowed to approach their capacity because people have a convenient alternative to their automobiles.

In effect, these area-wide averages are representative of the dominant congestion conditions experienced by groups of people throughout an area. It is recognized in this average measurement approach that some individual intersections or roadway segments would be operating at LOS conditions worse than the average, while others will be operating the same or better than the average. For that reason, a policy of doing Local Area Traffic Reviews is used to assess whether one or more particular intersection or roadway segment would operate at an unacceptable LOS.

B. An Assessment of Current Intersection LOS Conditions

For many years, staff of the Planning Board has been working in cooperation with Montgomery County Department of Transportation (MCDOT) staff to collect, analyze and, tabulate intersec-

POLICY AREAS GROUPED BY TRANSPORTATION SERVICE STANDARD

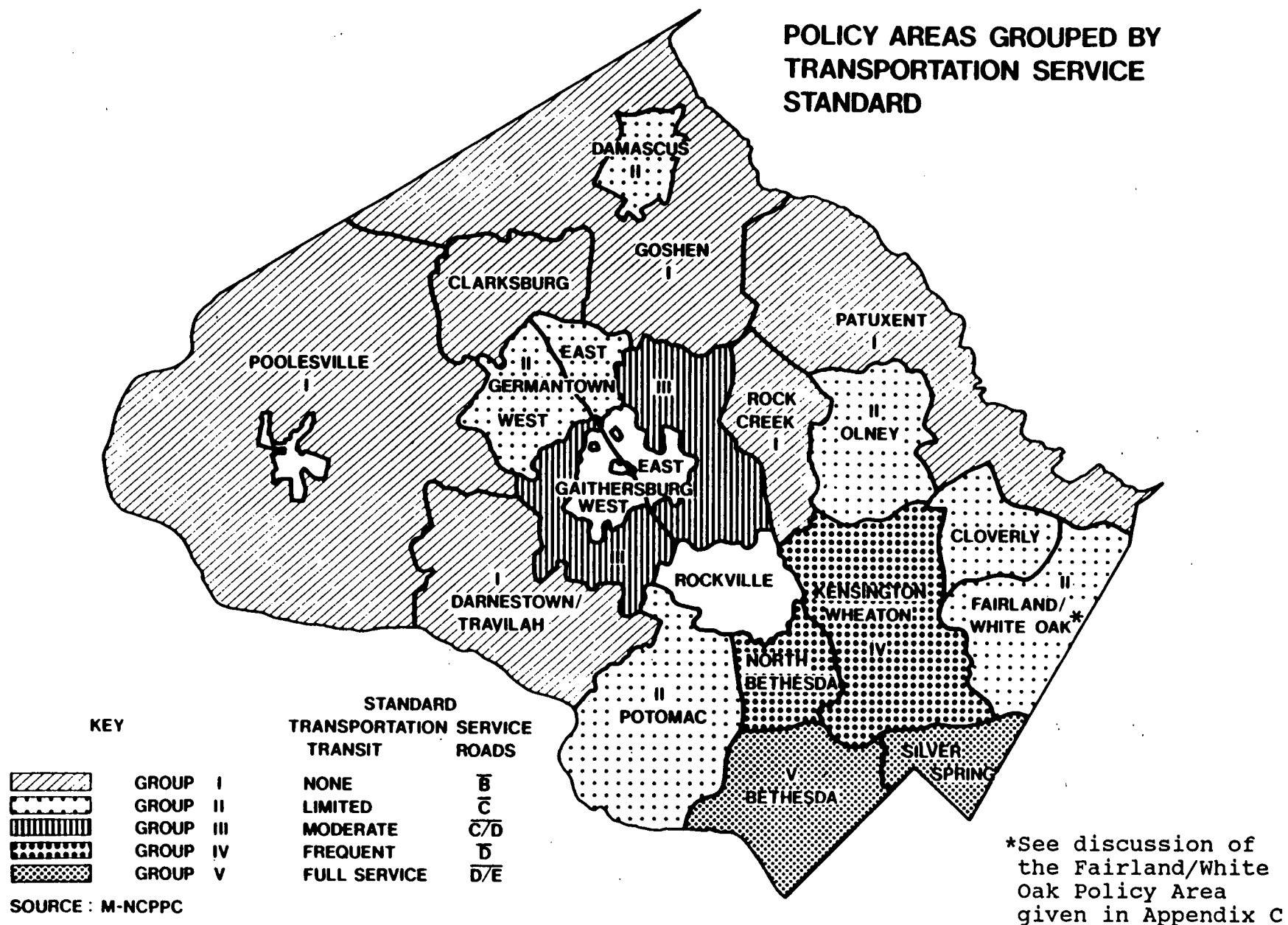


Exhibit 8: Policy Areas Grouped By Transportation Service Standards
(Source: 1985 Comprehensive Planning Policies Report)

tion LOS conditions. In 1977, the Board published the Peak Hour Intersection Level of Service Inventory which provided a tabulation of the then recent LOS conditions. An accompanying set of display maps was also prepared. That inventory has been updated since then on an intermittent basis. That collection of data and information has been summarized here to give an assessment of recent intersection LOS conditions.

1. The Location of the More Congested Intersections

Exhibit 9 shows the location of intersections that were classified as LOS "D", "E", and "F" in 1984. In using the date 1984, it must be understood that this year represents the middle of a period between 1983 and 1985, during which the traffic counts reflected in this exhibit were taken in the field. Due to budget constraints, the number of traffic counts taken each year has been limited, with the result that it takes approximately 3 to 4 years to completely update counts over the entire county. Recently, more money has been allocated for this function, but this will not begin to produce results until next year. Therefore, the best data available today is what is shown here, which lags behind the actual current situation by several years. It is hoped that fresh data will be available in time to incorporate it into the Annual Growth Policy report to be produced in the fall of 1986. In the meantime, the data shown in Exhibit 9 must be used with a judgmental allowance for the effect of the passage of time. Recommendations for improving the traffic counting process are given later in this report.

The intersection LOS is calculated using the Critical Lane Volume Method described in the 1985 report on Comprehensive Planning Policies. Traffic counts used for these calculations were provided by MCDOT. This exhibit used either A.M. or P.M. peak hour, depending upon which one is the more congested at each location.

The locational pattern of the currently more congested intersections can be seen in Exhibit 9. Generally speaking, the more congested intersections are found in the more urbanized areas of the County; there are essentially no congested intersections in the rural areas, with the exception of the Damascus area. The areas of North Bethesda and the several down-County areas have the most dense concentrations of the more congested intersections. However, a detailed examination of the full LOS Inventory does reveal that even in these areas there is a substantial proportion of intersections that operate at LOS A, B, or C.

2. Trends in Peak Hour LOS by Policy Area

Exhibit 10 is a summary tabulation that shows the number of intersections in each Policy Area which operated at LOS D, E, or F for each of the three time periods. The latest time period corresponds to the one used in the previous Exhibit. Exhibit 10 shows that in most policy areas the number of more congested

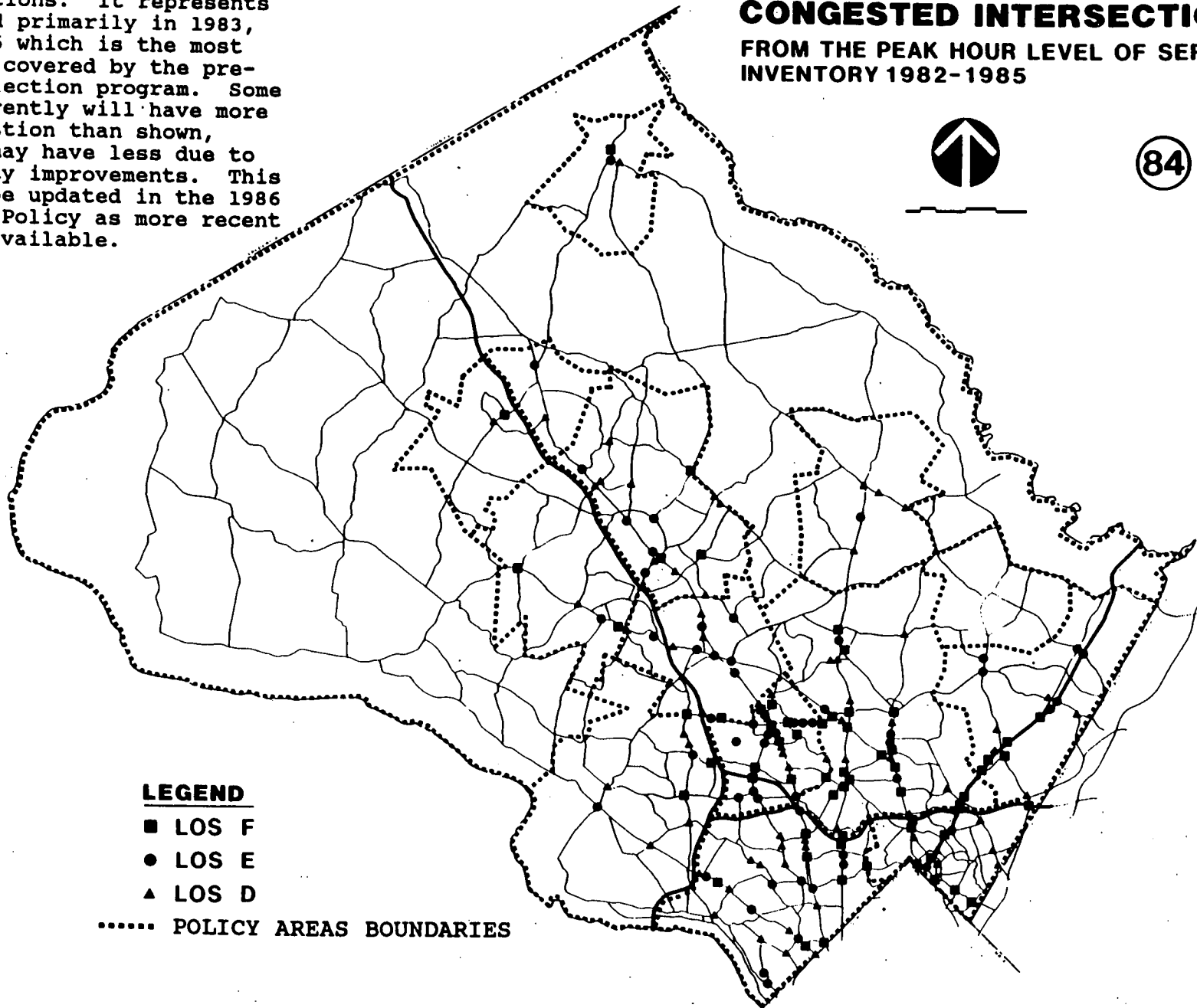
Note:

This information does not represent current conditions. It represents data collected primarily in 1983, 1984, and 1985 which is the most recent period covered by the present data collection program. Some locations currently will have more traffic congestion than shown, while others may have less due to recent facility improvements. This Exhibit will be updated in the 1986 Annual Growth Policy as more recent data becomes available.

**CONGESTED INTERSECTIONS:
FROM THE PEAK HOUR LEVEL OF SERVICE
INVENTORY 1982-1985**



84



LEGEND

■ LOS F

● LOS E

▲ LOS D

..... POLICY AREAS BOUNDARIES

Exhibit 9: Summary of Intersections Observed as Having
LOS D, E, or F Conditions

Exhibit 10: Historic Trends in the Number of Intersections, By Policy Area, Which Had Been Operating at LOS D, E, or F

Policy Group	Policy Area Name	1974-1977 * Level of Service			1978-1981* Level of Service			1982-1985* Level of Service		
		D	E	F	D	E	F	D	E	F
I	Balance of Wedge							0	0	0
II	Damascus				0	0	0	1	1	1
	Olney	1	2	0	0	1	0	4	1	0
	Germantown West	0	0	0	0	0	0	1	0	1
	Germantown East	0	0	0	1	1	0	1	1	0
	Cloverly	0	0	0	0	0	0	0	0	0
	Potomac	1	0	0	3	1	0	5	2	2
	Fairland/White Oak	2	2	1	7	1	2	5	6	6
III	Gaithersburg West	0	0	0	4	0	0	2	2	2
	Gaithersburg East	3	1	0	5	2	3	9	6	6
IV	North Bethesda	4	6	2	7	4	6	5	14	11
	Rockville	1	0	2	1	5	3	5	7	3
	Kensington/Wheaton	10	4	6	10	2	9	12	5	17
V	Bethesda	10	9	2	10	6	7	15	10	10
	Silver Spring/ Takoma Park	4	4	3	10	2	5	7	2	8
County Totals		36	28	16	58	25	35	72	57	67

*This information has been compiled from the Peak Hour Level of Service Inventory and gives representative LOS conditions over each of these four year time periods.

intersections has been increasing. A detailed analysis of this Exhibit shows that rate of increase in congestion between the second and third time periods is substantially greater than the rate of increase between the first and second periods. That observation is reflective in part of the higher rates of employment and residential growth during that last four year time period as shown earlier in this Report in Table 2 and Exhibit 4, on pages 6 and 16, respectively.

3. Effects of Recent Transportation Project Completions

The trends have shown that, in general, more intersections in most Policy Areas have become more congested over time. However, in many locations, LOS at specific intersections has improved after a new section of road has been open to traffic or after improvements have been made to an intersection, such as increasing the number of lanes approaching the intersection. An example of this is the recent relocation and reconstruction in Germantown of MD 118 from a 2-lane road to a 6-lane road between Aircraft Drive and Wisteria Drive and the construction of Wisteria Drive between MD 118 relocated and existing MD 118. Before these improvements were opened to traffic, the LOS at MD 118 and Middlebrook Road was LOS D and after it was opened to traffic the LOS had improved to LOS B. The LOS at MD 118 and Aircraft Drive also improved from LOS F to LOS D after the improvement was opened to traffic. Exhibit 9 shown earlier gives the LOS conditions as of mid 1985 and generally does not reflect the effects of recent transportation project completions due to the present lack of specific data of traffic movements after the completion of the improvements.

C. An Assessment of Current Average Level of Service Conditions

Recognizing that the collected traffic data lags behind the actual situation, staff has made an effort to estimate the current (i.e., June 1986) traffic conditions. This is a judgmental estimate, and will be refined in the Annual Growth Policy report next fall. This estimate compares the 1986 average LOS conditions over each policy area with the average LOS conditions which were set forth in the 1979 Staging Plan proposal. These were proposed then as a "reasonable" standard for growth management purposes, and have been used by the Planning Board since that time.

Next year the Council can review these standards as part of its action on the Annual Growth Policy. In the meantime, this Interim Growth Policy report uses the terms "Better", "Worse" and "Same" to reflect the staff's judgment about the relationship between current traffic conditions and the standards previously established.

Exhibit 11 gives the results of this comparative assessment. It shows that the areas of Silver Spring/Takoma Park, Bethesda/Chevy Chase, Kensington/Wheaton and Rockville are estimated to currently have average LOS conditions which are better than, or

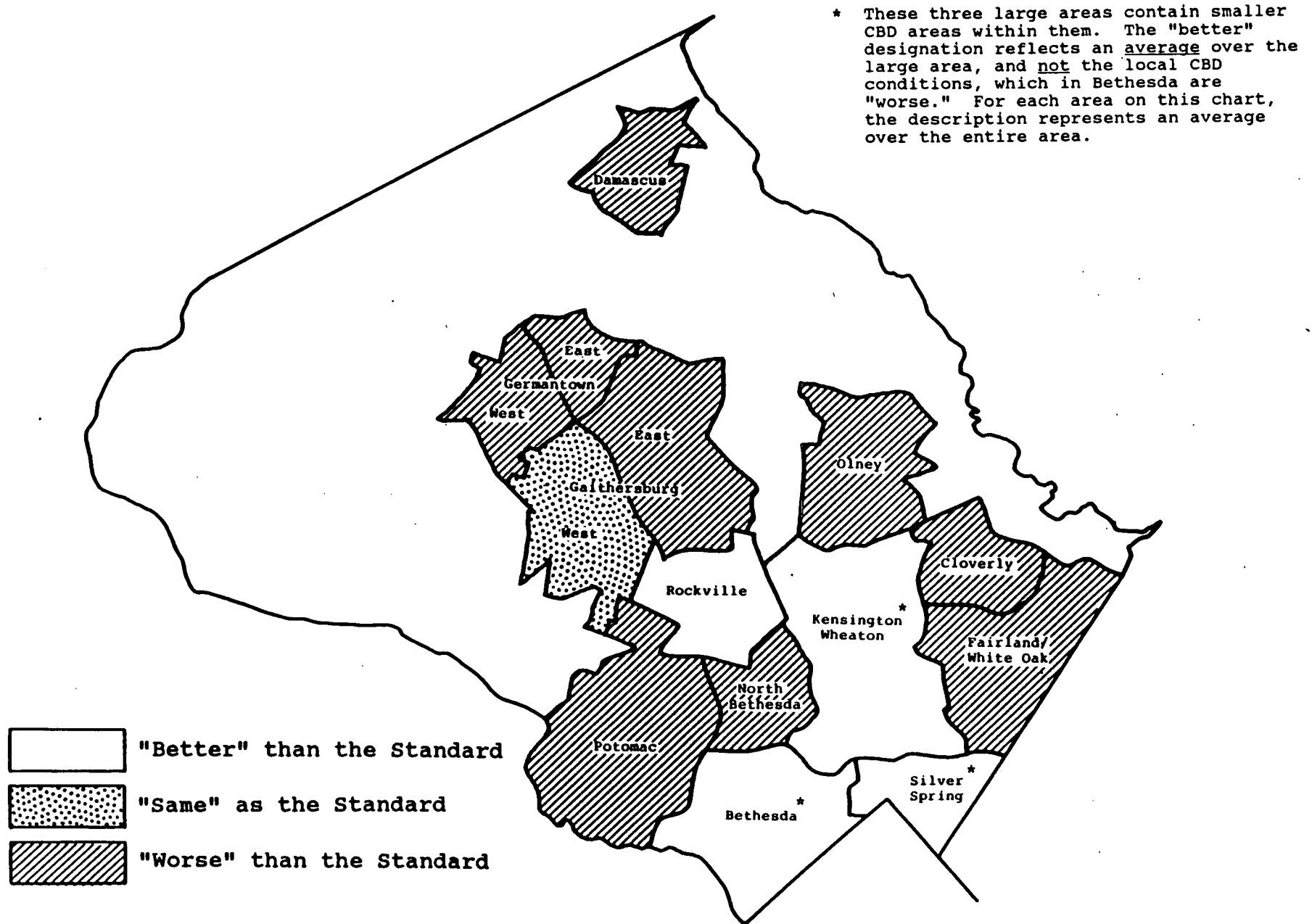


Exhibit 11: Comparison of Estimated Average LOS Conditions by Policy Area for June 1986 with the LOS Standards for Each Area

not as congested as, the transportation service standards for those areas, and one area is estimated to be essentially at its standards, that of Gaithersburg West. The rest are worse than the standard. It is important to note that these are average measurements over large areas, and that individual, local "hot-spot" congestion areas can occur within a larger area that statistically meets the standard on an average basis. For example, excess traffic congestion in Bethesda CBD can coexist with an acceptable LOS average over the entire Bethesda policy area. The growth limits placed on the Bethesda CBD are measured separately through the master plan process, at a greater level of detail.

In comparing the estimated average LOS value to the corresponding value of the standard, a criterion of being within plus or minus five percent of the standard is used to determine whether the current values should be considered as being the "same" as the standard. The remaining policy areas are estimated to currently have average LOS conditions worse or more congested than their standards; they are Fairland/ White Oak, Cloverly, Olney, North Bethesda, Potomac, Gaithersburg East, Germantown East, Germantown West, and Damascus.

The pattern of current average LOS conditions given in Exhibit 11 shows first that the areas which have values which are better than their standards, tend to be the down-County areas. The area which has the same LOS conditions as its standard has had a relatively large number of road projects completed in the past few years, either as Metro access projects or as economic development roads. The areas which have average LOS conditions worse than their standards tend to be the areas at the developing fringe. Those areas are the ones which have been experiencing higher rates of growth in the past few years.

One aspect of this assessment of current conditions that needs to be pointed out is that it is based upon a combination of recent traffic count data summaries and estimates which bring that data to the present. The most recent traffic count data summary which is available is that of the Average Daily Traffic for calendar year 1984, produced by MCDOT. The Average Daily Traffic Summary is a different data element than the counts used to produce the peak hour Intersection LOS Inventory in Exhibit 9. It relies on the same counts used for Exhibit 9, but it requires a mathematical exercise to extrapolate these counts to an estimate of average daily traffic representative of a 24-hour period. Consequently, the latest observed data is at this time almost two years old. Under current budgeting, the 1985 data will not be available until late this coming Fall. In a later part of this report, there is discussion of the need for and specific recommendations to improve the monitoring of LOS conditions.

D. An Assessment of Near-Term Projected Level of Service Conditions

The two previous sections of this report gave assessments of current LOS conditions as expressed in terms of intersection LOS and average LOS. A somewhat different technique is being used in order to assess near-term projected LOS conditions. This technique uses estimates of peak hour trips and displays them as a series of bars on a chart, with a paired set of bars for each Policy Area. One bar represents the trip demand associated with the near-term growth forecasts. The other represents the trip supply provided by the additional traffic capacity associated with transportation improvements which are scheduled for implementation in the near-term. This technique also allows for an assessment of efforts to reduce the trip demand by using various transportation related activities, which are being termed "traffic alleviation measures."

The bars are measured in terms of peak hour trips generated by both residential and employment activities and also account for estimates of the number of upstream and/or downstream trips passing through each area. This last feature is a refinement of this technique from the version first presented to the Council in January, 1986. In order to do this refinement, a special "spread sheet" program was prepared which takes the trips generated in each area and distributes them to destinations in other areas in proportion to the distribution of trips from the traffic model used in the threshold analysis. Please refer to Appendix D for details on this program.

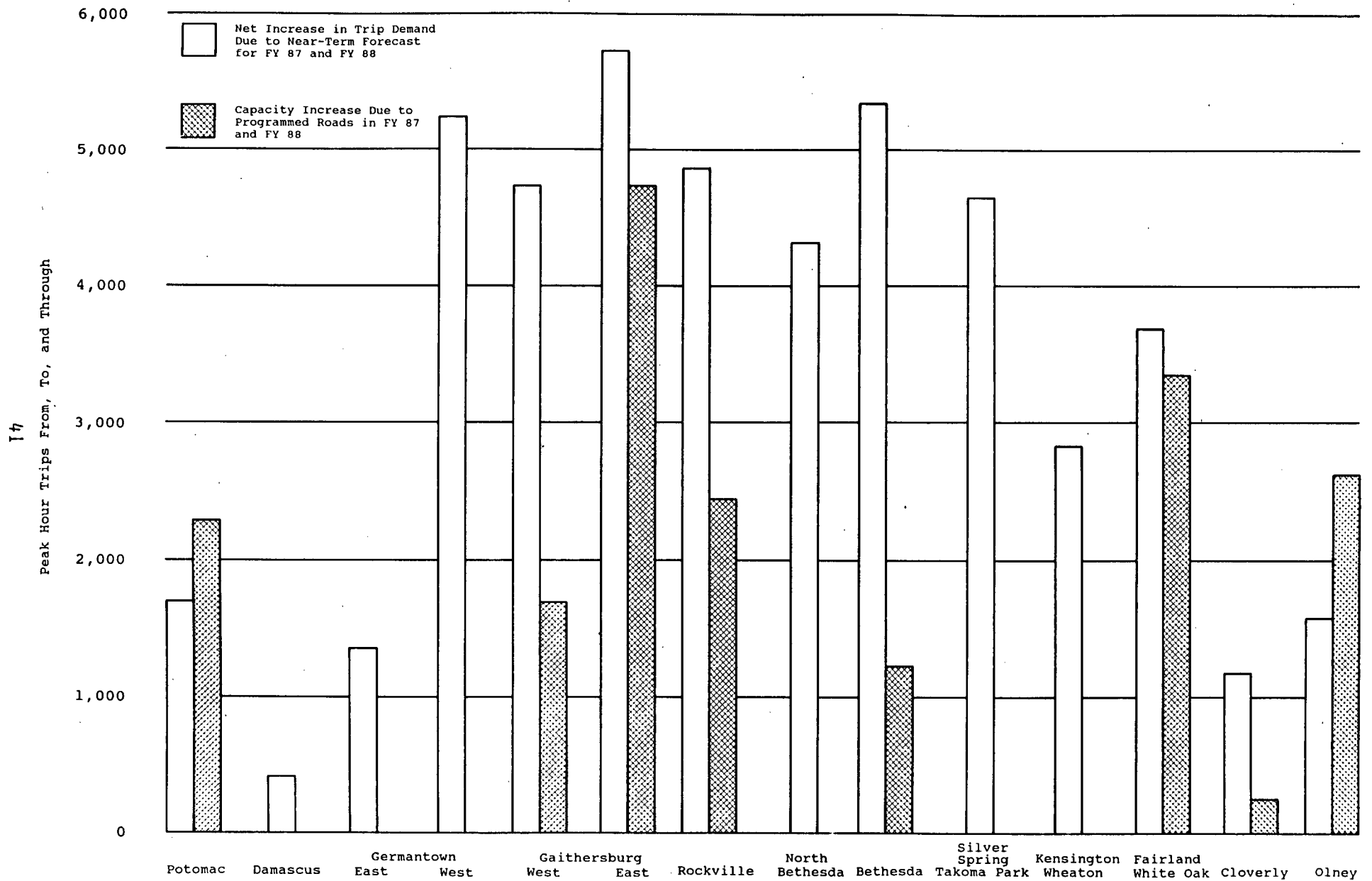
1. Near-Term Projected Increases in Trip Demand and Supply

Exhibit 12 presents the first of the bar charts. The bars on the left show the estimated incremental increase in peak hour trip demand due to the near-term forecast of residential and employment growth for FY 87 and FY 88 presented in Chapter I. The bars on the right shows the estimated incremental increase in highway supply which will be completed in FY 87 and FY 88, measured in terms of peak hour trips that can be served by those improved or new roadways.

The policy areas are ordered on the chart in a particular sequence to reflect the two main corridors in the County. The I-270/MD 355 Corridor is shown first with the most rural to most urban area going from left to right. The second main grouping is for the Georgia Avenue and U.S. 29 corridors, in this case moving from the most urban on the left to the most rural on the right. This progression allows the reader, in scanning from left to right, to see the sequence of traffic conditions along an imaginary "corridor" line that moves from Potomac up to Damascus, then southwest down the I-270 Corridor to the I-495 Beltway, and then northeast back up the Georgia Avenue and U.S. 29 areas.

Exhibit 12 shows a projected increase in trip demand of almost 6,000 peak hour trips for the Gaithersburg East area due

**Exhibit 12: Two Year Change in Traffic Demand vs. Traffic Capacity
Based on Roads ALREADY PROGRAMMED**



to the near-term forecasts for the FY 87 and FY 88 time period. The "profile" of projected increases in trip demand shows a fairly high and somewhat uniform increase from Germantown to Bethesda. When one calculates the percentage increase over an estimate of the base of current trips at the end of FY 86, the Germantown area has the highest percent increase with a growth of over 15 percent for the total of the two year forecast period. The increases in the Gaithersburg area will be over 10 percent for the two year forecast period. The incremental trip increases in the eastern County areas range from about 1,000 to nearly 5,000, generally increasing as one gets further down-County. It should be remembered that these estimates include downstream and upstream effects from trips passing through each area; for example, there are trips originating in Germantown being counted in Gaithersburg as they head to Rockville or North Bethesda, and vice versa.

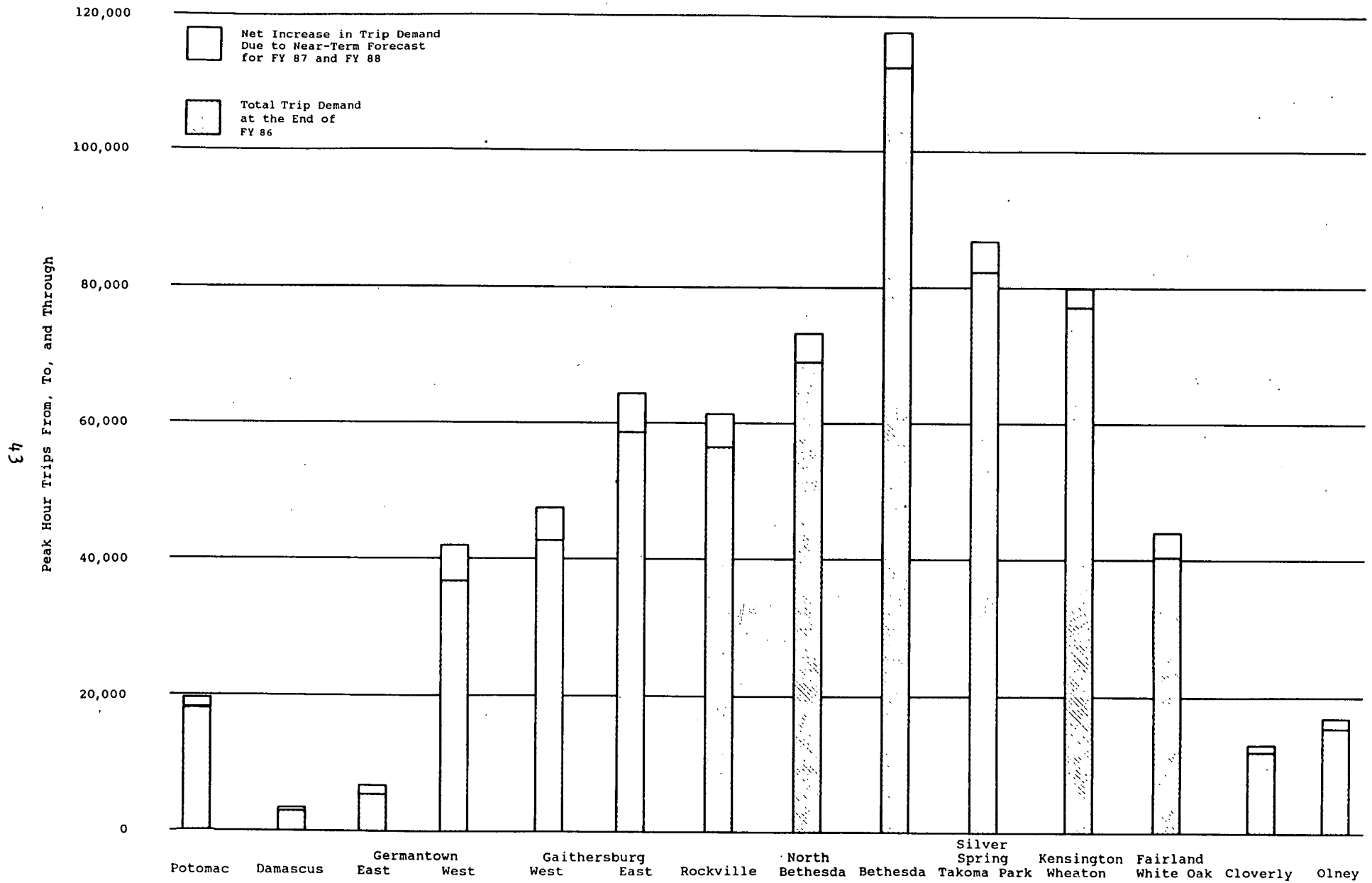
The last feature of Exhibit 12 which needs to be described is the estimate of near-term supply, or capacity, from the programmed highway improvements for each area. This is shown as increases in height of the supply bars, for FY 87 and FY 88 combined. The height of each supply bar is made from: (1) estimates of the project by project thresholds derived from the Policy Area thresholds contained in the Comprehensive Planning Policies Reports over the last several years, and (2) applying those threshold amounts to the spread sheet program to estimate the number of associated trips. Exhibit 12 shows that the largest supply increase over the near-term should occur in the Gaithersburg East Policy Area. Other areas which would have increases in supply are Potomac, Gaithersburg West, Rockville, Bethesda, Fairland/White Oak, Cloverly and Olney Policy Areas.

2. Near-Term Projected Programmed Traffic Alleviation Measures

Before proceeding into the specifics of the assessment, it is emphasized that the analysis presented in Exhibit 12 represents an analysis of trips on the margin. This has been done to emphasize the differences and changes in the near-term, especially with respect to the variation in change between one sub-area of the county and another. In doing this, it is recognized that, compared to the base total, these changes are often small in percentage terms, perhaps only a few percentage points. For example, Exhibit 13 shows that the forecasted increase in peak hour trips for the two year period generally falls in the 5-10% range over the various sub-areas, when compared to the estimated "base" number of peak hour trips under current conditions. It should be noted that the estimate for this "base" number will be updated and improved in the Annual Growth Policy produced next fall.

This method of marginal analysis runs the risk that the uncertainties of forecasting may become relatively large by comparison with the size of the marginal changes themselves. For this reason, these differences should not be reviewed as being

**Exhibit 13: Two Year Change in Traffic Demand
Compared to Existing Total Traffic Demand**



absolutely precise, but rather should be considered to be accurate only in proportional terms, that is to say in terms of the relationships between base and change and between different sub-areas of the county. This analysis has been done using a computer to assist and keep records of what is essentially a hand adjusted and somewhat simplistic mathematical technique. These techniques are somewhat experimental in nature, and further work is necessary to improve upon them.

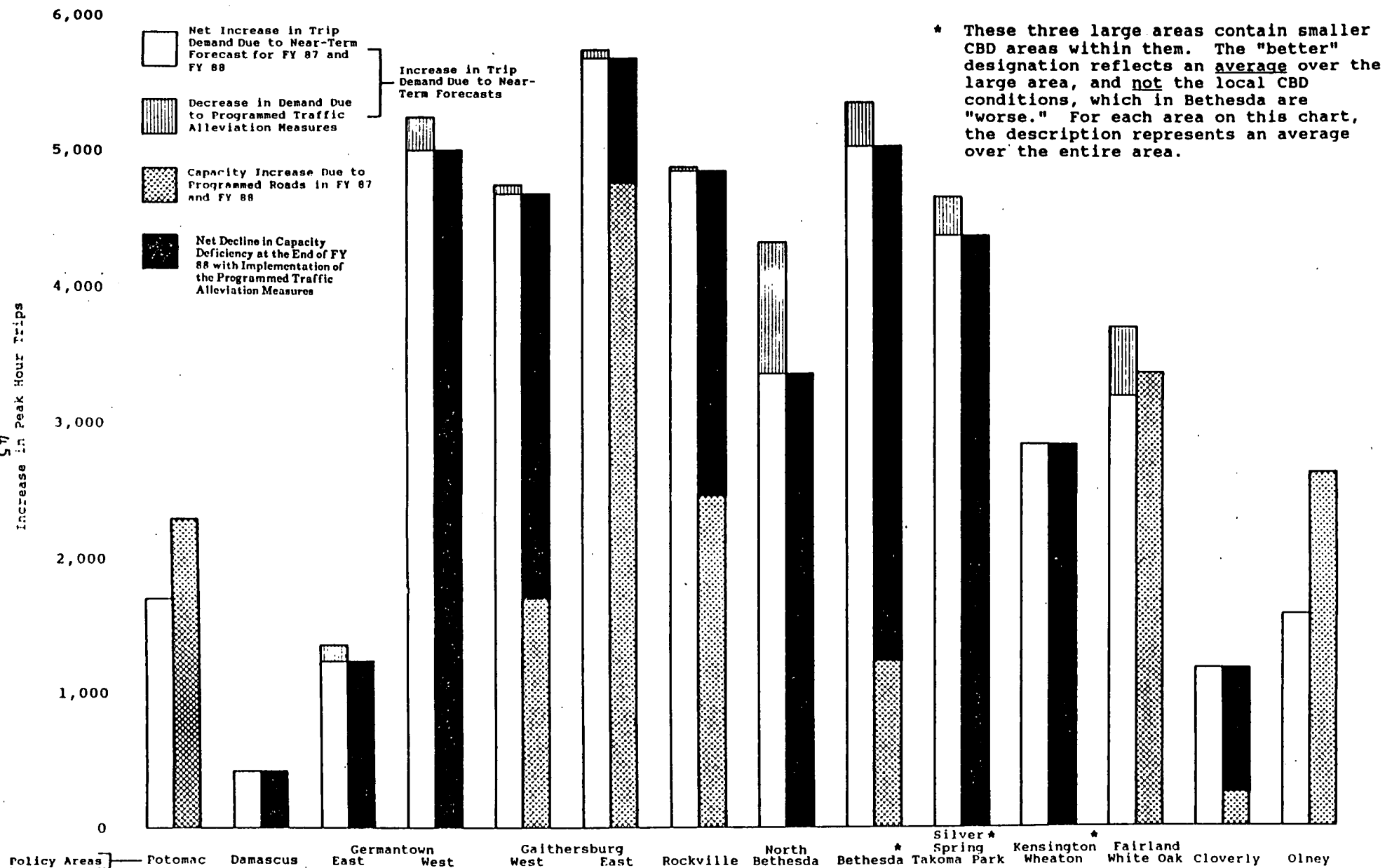
Exhibit 14 adds to the information of Exhibit 12 the projected effects of programmed traffic alleviation measures. These are ones which have already been programmed by various public agencies, or are committed for implementation in the near-term by the private sector as part of their conditions of approval of their subdivision or site plans. Examples of such programmed improvements are the Share-a-Ride projects already being carried out by MCDOT, the special express bus and fare reduction services in the I-270 and U.S. 29 Corridors which are budgeted for further expansion in early FY 87, Commuter Rail Improvements by MCDOT and MDDOT, and developer financed Share-A-Ride projects in the Germantown, Fairland, and North Bethesda areas.

The effect of the programmed traffic alleviation measures on each area is shown as the "striped areas" within the top part of the demand bar (on the left side). The height of these striped areas represents the amount of decrease or reduction in demand due to those measures. Consequently, the bottom of the striped areas represents the estimate of the two year forecast of demand adjusted for programmed traffic alleviation measures. The techniques used to establish the incremental increase in demand, due to the projected near-term forecasts, uses conventional vehicular trip generation rates. Therefore, the accounting for the effect of programmed traffic alleviation measures, as well as the additional measures considered in the subsequent chapter, has been treated and shown as a reduction in demand for vehicle trips.

3. Comparing Demand to Supply: Projected Near-Term Average LOS Conditions

The next feature of Exhibit 14 which needs to be explained is the "black portion" of the supply bars. They represent the net new demand which will remain unsatisfied by the new road projects and the traffic alleviation measures. Now that each of the main input elements of Exhibit 14 has been explained, we can conclude this chapter with (a) a comparison of the projected forecasted increases and reductions in trip demand, to the corresponding increases in trip supply, and (b) an assessment of projected near-term LOS conditions. This is done by first comparing the top of the supply bar to the bottom of the striped area of the demand bar in Exhibit 14. For those Policy Areas that have no projected supply increase in the next two years, the comparison is made from the base line equilibrium point at the end of FY 86. These differences are shown as the solid black bars in Exhibit 14. These comparisons are good indicators of the degree to which the near-term average LOS conditions will worsen

Based on Roads and Alleviation Measures ALREADY PROGRAMMED



Estimated Traffic Congestion Compared to the Staging Policy Standards for:

FY 86	worse	worse	worse	worse	same	worse	better	worse	better*	better*	better*	worse	worse	worse
FY 88	same	worse	worse	worse	same	worse	better	worse	better*	better*	better*	worse	worse	same

in those Policy Areas. If the top of the supply bar is shown above the top of the demand bar, as is the case for the Potomac and Olney areas, then there should be some improvement in average LOS conditions in those areas over the next two years. The comparison for the Fairland/White Oak area shows that the programmed traffic alleviation measure would result in a marginal improvement in LOS conditions compared to the base line at the end of FY 86.

Exhibit 14 also includes a chart across the bottom which gives the summary of the estimated LOS conditions for each Policy Area compared to the Staging Policy standards for two time periods, the end of FY 86 and the end of FY 88. The conditions are characterized as being worse, the same, or better than the standards. The information shown for the FY 86 line is the same information previously shown in Exhibit 11. The results shown for the FY 88 line are based upon the estimates given in Exhibit 14 and a more detailed analysis given in Appendix E. That detailed analysis accounts for best estimates of how much worse or better the base line LOS conditions are compared to the standards. The following is a general explanation of the results of Exhibit 14.

The average LOS conditions are expected to change for only two policy areas, Potomac and Olney. In both instances, that would be due to supply increases of programmed road projects which would change them from worse conditions to ones which would be the same as the standard. In all of the remaining areas, the average LOS conditions are not projected to change from their LOS conditions at the end of FY 86. The information shown for FY 88 is shown in map form in the next exhibit. It should be noted that the descriptions of conditions reflect an average over the entire policy area in each case, and do not reflect local "hot spot" congestion situations, such as particular intersections or localized areas such as the Bethesda CBD, which currently is at a "worse" than standard condition.

Exhibit 15 shows the estimate of near-term projected LOS conditions by policy area, compared to the standards for those areas, for the point in time at the end of FY 88. It shows that it is estimated that there would be seven policy areas with LOS conditions worse than their corresponding standards: those of Damascus, Germantown East and West, Gaithersburg East, North Bethesda, Fairland/White Oak, and Cloverly. These are the areas which should be prime candidates to which traffic alleviation measures should be targeted during the next two years.

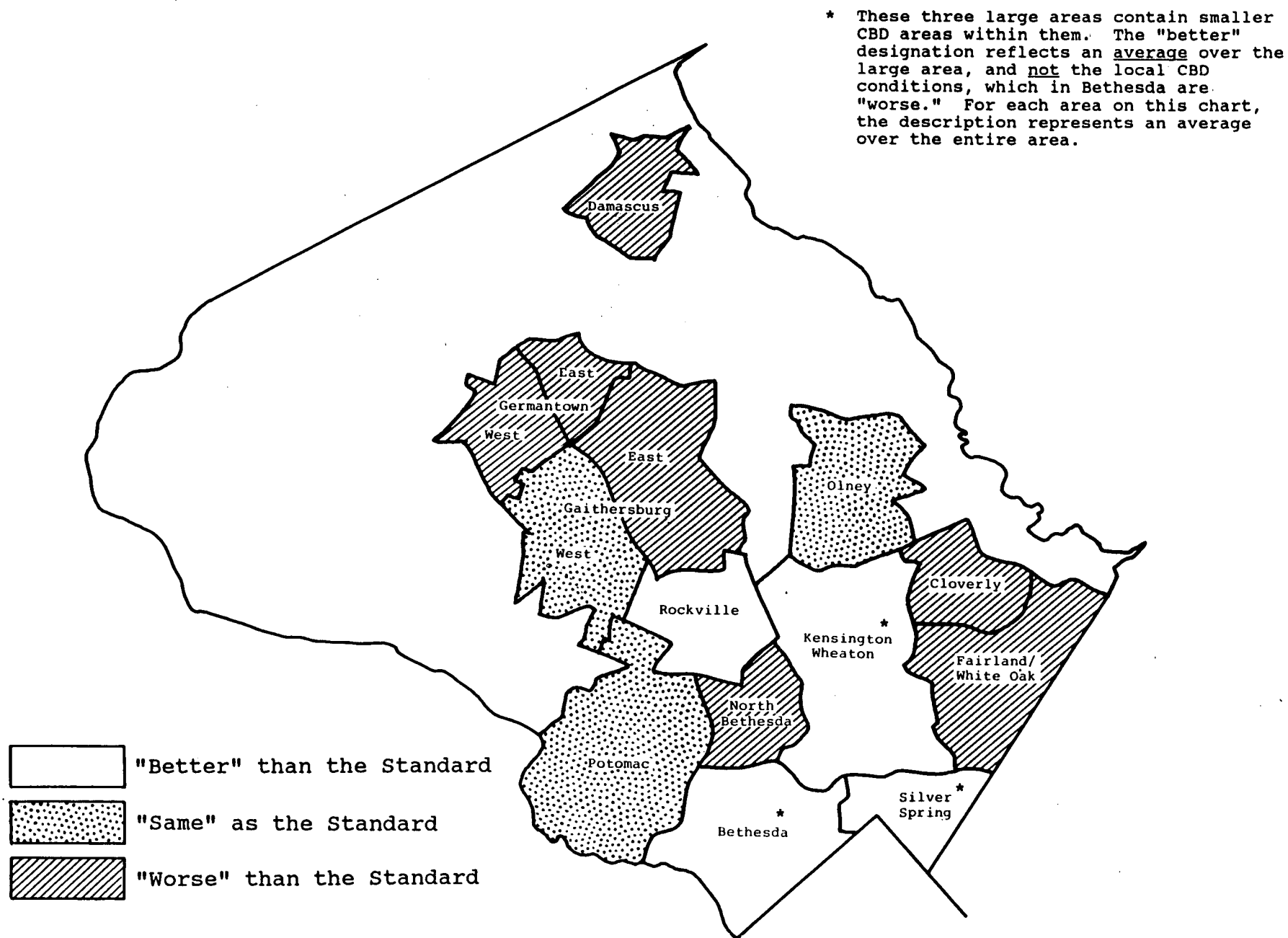


Exhibit 15: Comparison of Estimate of Near-Term Projected Average LOS Conditions by Policy Area for June 1988 with the Standards for Each Area

CHAPTER III. DISCUSSION OF POTENTIAL TRAFFIC ALLEVIATION MEASURES AND AN ASSESSMENT OF THEIR EFFECTIVENESS

The Consensus Committee appointed by the County Council this past fall put a good deal of effort into assessing the need for actions by the County to alleviate current congestion on transportation facilities as well as to minimize increases in that congestion. The phrase "traffic alleviation measures" was coined to encompass the collection of potential actions discussed and recommended by the Committee. Within the transportation field, the term of Traffic System Management (TSM) actions is most often used in describing such measures. This report will use the local term to emphasize that the main intent of these measures is to alleviate traffic congestion.

Traffic alleviation measures have become increasingly recognized across the nation, as many metropolitan areas wrestle with traffic congestion problems caused by increased automobile ownership, more wage earners per household, suburban employment growth, cyclical building booms, etc. However, there is not yet developed any large body of direct experience with traffic alleviation measures on a large scale. It remains an experimental field, and requires pioneering efforts. Consequently, this chapter will present first a framework reference model against which to understand better the role of traffic alleviation measures. Following this is listed a series of possible traffic alleviation measures. These are evaluated in terms of their costs, difficulty of implementation, and traffic reduction effectiveness.

A group of these alleviation measures that are recommended for implementation during FY 86-87 is presented in Chapter IV.

A. Reference Framework Model for Alleviation Measures

Exhibit 16 illustrates that there are many factors which influence the phenomenon known collectively as traffic congestion. What is desirable is a simplified version of these factors, so that the relative practicality and cost-effectiveness of various traffic alleviation measures can be seen in perspective, without getting lost in a maze of sub-factor technicalities. For purposes of this Interim Growth Policy, a preliminary model has been developed to provide this perspective.

This model first divides the universe of factors into three categories: (1) Home Based Factors; (2) Trip Based Factors; and (3) Work Based Factors. This division reflects the most significant facts of the general traffic situation, namely that: (1) it is daily peak period trips that create the congestion, and that (2) the nature of these peak period trips can be influenced by changing either (a) the conditions that affect the origin of the work trip from the home, or (b) the conditions that affect how the traveler arrives at his work destination, or (c) the conditions that affect how the trip is carried out between these two origin-destination points. Within these three basic categories,

we can develop further sub-categories. There could be many of these, as Exhibit 16 illustrates. We believe it is useful to concentrate on nine of these, clustered together as follows.

HOME BASED FACTORS

1. Auto Ownership
2. Other Trip Generation
(i.e. family structure, economics, substitutes for travel, etc.)

TRIP BASED FACTORS

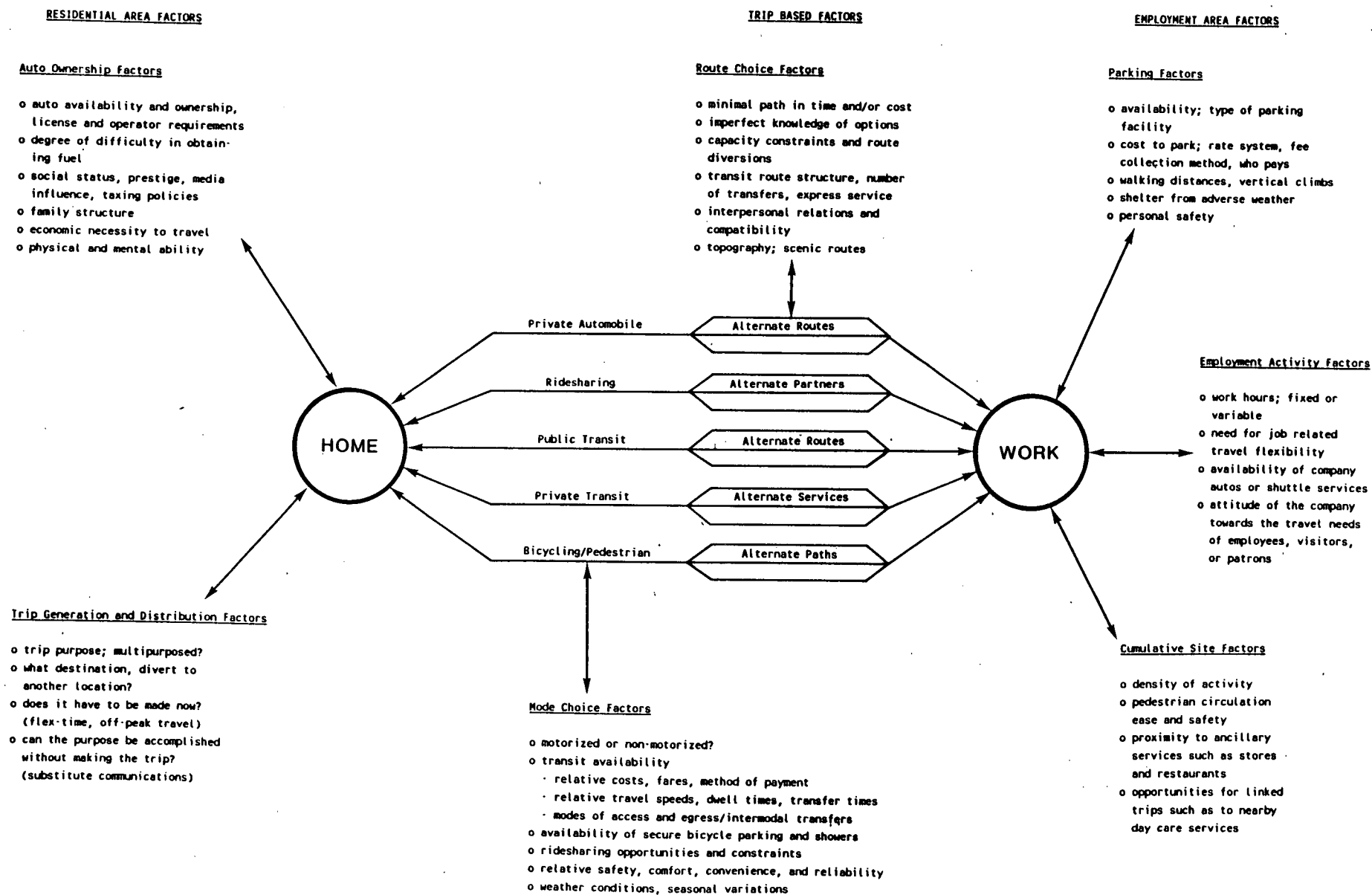
3. Private Vehicles (mode/route choice)
4. Ride Sharing (mode/route choice)
5. Public and Private Transit (mode/route choice)
6. Bicycle/Pedestrian (mode/route choice)

WORK BASED FACTORS

7. Parking
8. Employment Conditions
9. Cumulative Site Characteristics
(i.e. density, other destinations, pedestrian convenience, etc.)

Each of the nine factors mentioned above contributes to an individual person's decision about how and where he or she makes the trip from home to work and vice versa. Historically, the role of government has been focused primarily on the trip based factors, and further focused primarily on supplying the roads and paths on which the vehicles will travel, and in the case of transit, providing the vehicles themselves. In general the Home Based and Work Based Factors have been considered to be in the realm of the private sector entirely, with the possible exception of Number 9, Cumulative Site Characteristics, which is partially influenced by land use planning and zoning and related public facility infrastructure provision. The result is that the basic driving forces which produce traffic congestion (Home Based and Work Based Factors) historically have been considered to be inappropriate areas for the exercise of governmental influence. Consequently, government's response to increasing traffic congestion historically has been to increase the capacity of the road network and/or to provide an alternative mode in the form of public transit. In recent years the concept of spending government dollars to encourage private ridesharing has become accepted also. As time goes on, the challenge of coping with

Exhibit 16 : Travel Behavior Factors Relating To a Trip From Home To Work



spreading growth and development will increasingly become the challenge of influencing behavior so as to shift from the current heavy dependence on private automobiles to an increasing use of alternative modes.

In adopting the Interim Growth Policy legislation, the County Council requested the Planning Board to include an assessment of a broad range of traffic alleviation measures, with the understanding that not all of them would be addressed in detail in the Interim Growth Policy, and that further elaboration would be provided in the next Annual Growth Policy to be produced in the fall of 1986. This reference model provides a framework on which to build in the future a more detailed evaluation of individual measures. The discussion in this chapter focuses on a smaller set of measures that are believed to be cost-effective in the short term. The recommendations made herein do not exhaust the full range of alleviation measures that should be considered in the long term.

It must also be noted that this is a preliminary effort at measuring the trip reduction effect of these measures. Because there is rather limited national experience with such measures, there is relatively little established information on which to base reliable projections related to traffic volumes. So far as we are aware, this work is at the cutting edge of the science of traffic analysis. It is important for the reader to appreciate that there is a range of uncertainty associated with the numbers used in this report, and that these will need to be refined as time goes on and as more data and knowledge is obtained.

Different recommendations are presented with different degrees of detail. For example, most of the transit related measures are presented rather generally. This reflects both the large number of alternative ways in which the measure could be actually carried out, as well as the large institutional base needed to support the transit programs. These recommendations would need to be developed by either WMATA or MCDOT to produce very specific projects to carry out the general intent of the recommendation. In other cases, where there is no history of institutional development, some specific details have been suggested to provide a better basis for implementation.

The following discussion of specific recommendations is organized chronologically to accord with the list of factors shown in the above reference model. Many of them relate to other measures that have already been incorporated into the County's budgeting process, and which have already been mentioned by the Consensus Committee Report of December, 1985. All of the specific recommendations contained herein are over and above those items which have already been approved by the Council. It is anticipated that the County Executive Branch may wish to recommend somewhat different specific projects for immediate implementation. It is expected that there may be a fruitful dialogue prior to the Council taking final action. Finally, it is assumed that this entire subject matter will be continued and

developed further in the first Annual Growth Policy to be released next fall.

B. Discussion of Traffic Alleviation Measures

RESIDENTIAL AREA CATEGORY

Exhibit 17 gives a summary identification and evaluation of residential area traffic alleviation measures. A discussion of such potential measures follows:

1. Automobile Ownership Measures

Automobile ownership is a major determinant of people's choice of travel mode. Households with fewer automobiles make fewer trips and tend to travel more by public transportation, ridesharing, bicycle, and walking. Obviously, there is a strong correlation between the level of urbanization, the availability of alternatives to the private automobile, and household automobile ownership levels.

Household automobile ownership levels estimated in the 1984 Census Update survey clustered into three groups, with a wide range across the County. In the Silver Spring and Takoma Park Planning Areas, the only parts of the County served by Metro in 1984, the average auto ownership rate was about 1.25 per household. In Bethesda and the I-270 and Route 29 growth corridors this rate varied from 1.7 to 1.9. In the rural and fringe areas, including Olney, Cloverly, Rock Creek, Damascus, and Potomac, the auto ownership rate was from 2.2 to 2.6 per household. When differences in average household size are accounted for, one still finds that automobile ownership in the suburban growth area was about 20% higher than in Silver Spring/Takoma. The rural/fringe areas showed ownership levels about 45% higher than Silver Spring/Takoma.

a. Enhanced Alternatives to the Private Automobile.

Studies examining the impact of Metro and light rail systems on community travel characteristics have generally shown that average household automobile ownership levels in areas in close proximity to stations decline somewhat after the opening of high quality rail service. The opening of the Red Line extension to Shady Grove could be expected to produce similar effects over the next several years as people desiring a less automobile-oriented lifestyle selectively move into these areas. This should result in a higher portion of transit, bicycle, and walking trips along the Red Line corridor. This trend might be accelerated by implementing the alleviation measures outlined in this report that improve pedestrian, bicycle, bus, and van shuttle access and egress to and from Metro and by general improvements to public transportation and the infrastructure for bicycles and pedestrians.

b. Impose County Auto Registration Fee or Area License.

Other alleviation measures to affect automobile ownership levels

EXHIBIT 17 - EVALUATION OF RESIDENTIAL AREA TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
1. <u>Automobile Ownership Measures</u>					
a. Enhanced Alternatives to the Automobile.	H	H	H	--	--
b. Impose County Auto Registration Fees or Area License.	H	L	H	--	--
2. <u>Trip Generation and Distribution Measures</u>					
a. Implement Marketing and Educational Programs to Lessen Vehicular Trip Generation Rates.	M	L	L	--	--
b. Impose Odd/Even Licensing Scheme.	H	M	H	--	--
c. Develop Street Designs to Shape the Travel Environments of Neighborhoods.	H	H	M	--	--
d. Offer Incentives to Reduce Work Trip Lengths.	M	H	M	--	--

can be identified. The imposition of a County automobile registration fee or area licensing fee could serve as a disincentive to possession of multiple automobiles in a household, particularly if the fee schedule was set to impose higher charges on households with more automobiles at the same address. High automobile registration fees and sales taxes are commonly used in Western Europe and Japan to discourage high levels of automobile ownership, to raise substantial revenue, and to compensate for the negative social, energy, and environmental effects of the automobile in urban areas.

2. Trip Generation and Distribution Measures

Trip generation rates describe the rate at which people or households choose to make trips of any sort. Measures that encourage people to postpone or avoid making automobile driver trips during the peak hours, particularly in those areas with the worst congestion, will help in alleviating the County's traffic problems.

Trip generation rates vary widely across the County and among different household types. Numerous factors influence automobile driver trip generation rates, including automobile ownership, employment status, family structure, income, age, the density and heterogeneity of neighborhood development, the quality of the environment for pedestrian and bicycle travel, proximity to public transportation, and the quality and frequency of transit service.

There are many ways that the County can influence automobile driver trip generation rates in the long-term (a) by helping to shape development patterns at both the neighborhood and corridor level, (b) through investments in transportation infrastructure and services that will favor some modes of travel more than others, and (c) by marketing and educational programs designed to influence public expectations regarding the overall transportation system and to shape the climate of opinion in the community towards specific modes of travel. In addition, there may be limited, long-term opportunities for substituting communications for travel using advanced technologies.

In a two-year time frame, however, there is little that the County can do to affect development patterns, available infrastructure, or trade-offs between travel and communications except to identify necessary changes in policies and the direction and modal balance of long-term capital programming. Marketing and educational programs can be implemented in this short time-frame, however. Such programs related to shaping the climate of opinion in the community towards specific modes of travel are discussed below as Trip Based Factors.

a. Implement Marketing and Educational Programs to Lessen Vehicular Trip Generation Rates. Marketing and educational programs could be designed to educate County residents and workers about suburban traffic congestion problems afflicting Montgomery

and other fast-growing counties. Such programs would seek the cooperation of the public in deferring, linking, or changing modes for their peak-hour trips so that everyone might enjoy a less-congested transportation system. To succeed, such programs would have to have the strong support of elected officials and various public interest groups in the County who would provide leadership in working to build public support.

During Fiscal Year 1987, the Planning Board will be conducting a Comprehensive Study of Trip Generation Rates. The study will focus primarily upon the collection of local data to better determine appropriate local rates for various land uses and activities. That study will also have a public participation component and will address various policy issues surrounding selecting appropriate trip generation rates. Identification and assessment of some specific traffic alleviation measures could also be done during the preparation of the study results.

b. Impose an Odd/Even Licensing Scheme. An alleviation measure that could have a very dramatic effect on household auto driver trip generation rates would be the adoption of an odd/even licensing scheme, similar to that used in Athens, Greece to deal with severe air pollution problems. Under this approach, automobiles could be used only every other day during weekdays, with the days of permitted use determined by whether the auto license number ended in an even or odd number. Obviously this severe measure would be politically acceptable only in a grave crisis.

c. Develop Street Designs to Shape the Travel Environments of Neighborhoods. There are more positive approaches that could reduce both automobile ownership and residential auto driver trip generation rates, but that could only begin to have an effect within a two year period. One of the more notable would be to create a number of "woonerfs," in residential neighborhoods of the County.

Woonerfs are generally residential streets, popularized in Holland and Germany, that have been redesigned such that sidewalks and street space are merged and automobiles are forced to travel at the speed of a pedestrian in a shared street environment. West Montgomery Avenue in front of the Old County Court House is a partial example of this concept, which has been successfully realized in full form in neighborhoods of Columbia, South Carolina, Cambridge, Massachusetts, and Rochester, New York. By rearranging the distribution of parking spaces, play areas for children, and street landscaping, a non-linear street pattern which is safe for playing children, talking neighbors, and bicyclists can be created which still permits automobile access in a fashion compatible with these multiple uses.

Although woonerfs are often promoted as simply a way of dealing with neighborhood traffic problems, in fact, they offer a strategy for improving bicycle and pedestrian mobility in more densely built up areas and putting these modes on a more equal footing with the automobile. Like other schemes for constraining

automobile use in urban areas, woonerfs act synergistically with other improvements to transit and non-motorized modes to reduce peak hour auto driver trip generation and traffic congestion. Woonerfs would be appropriate in any of the more densely built-up areas of the County and in new townhouse developments.

d. Offer Incentives to Reduce Work Trip Lengths. Another possible approach, which might begin to show some effect on auto driver trip generation rates over two years, is to offer incentives to residents who live within walking or cycling distance of their workplace. Princeton University and several other organizations have shown modest success with mortgage subsidies for employees living within a short distance of the worksite. Property tax discounts are another possibility.

TRIP BASED CATEGORY

3. Private Automobile Measures

Exhibit 18 lists three potential traffic alleviation measures, which in this case were each identified by the Consensus Committee and given previous endorsement by the County Council. These measures are (a) increased use of automation in traffic signal systems; (b) establishment of an improved system for expedited clearance of traffic accident scenes, stalled vehicles, and other obstruction to traffic flow; and (c) installation of helicopter evacuation and traffic control service by the Montgomery County Police Department. As a group, these traffic alleviation measures are not intended to change travel behavior to remove vehicles from the road or to divert trips to non-peak travel times. Their main intent is to provide for more efficient traffic flow with less interruption caused by unanticipated incidents. This would result in a perception of less congestion in the County and hence has been proposed as traffic alleviation measures.

a. Increased Use of Automation in Traffic Signal Systems. the MCDOT program to provide centralized computer control of traffic signals throughout the County is a valuable one which has been underway for several years. One of its main purposes is to move traffic more efficiently and thereby reduce the congestion. To the extent that the pace of completion of this multi-year project can be quickened, without sacrificing the necessary quality control for the system, then additional resources could be usefully applied. Our analysis of current conditions assumes that the timing of traffic signals is already set to provide efficient operation. Therefore, this measure will enhance the public perception of congestion alleviation but will not yield more capacity in terms of development review activities.

b. Expedited Clearance of Traffic Accidents and Blockages. A variable proportion of the daily congestion experienced in the County is due to temporary blockages of the capacity of the transportation system due to traffic accidents or various ob-

EXHIBIT 18 - EVALUATION OF PRIVATE AUTOMOBILE AND RIDESHARING TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
(L=Low M=Moderate H=High)					
3. <u>Private Automobile Measures</u>					
a. Increased use of automation in traffic systems.	H	M	L	#13	yes
b. Establishment of an improved system for expedited clearance of traffic accident scenes, stalled vehicles and other obstructions of traffic flow.	H	H	L	#14	yes
c. Installation of helicopter evacuation and traffic control service by the Montgomery County Department of Police.	H	H	L	#15	yes
4. <u>Ridesharing Measures</u>					
a. Strengthen staffing of Silver Spring and Bethesda Share-A-Ride programs.	L	L	H	#1	yes
b. Establish additional.Share-A-Ride programs in the County.	M	M	H	--	--
c. Intensify promotion of ridesharing with advertising.	L	L	L	#2	yes
d. More effective marketing of regional and statewide carpool and vanpool programs.	L	M	L	--	--

structions such as stalled vehicles, debris, or utility emergencies, parking violations and repairs. Several major prolonged temporary blockages of the Capital Beltway, due to accidents, during the past year or two have provided vivid examples of this. This past spring, a regional conference was held on the need to address short-term and long-term traffic problems of the Beltway and to foster work on various solutions. Information prepared for that conference estimated that about half of the congestion problems experienced by motorists using the Beltway were due to accidents and other blockages. Stronger enforcement of parking violations, particularly in the peak hour, could be effective in alleviating some localized congestion situations. In other locations, consideration could be given to further removing existing on-street parking to provide needed street capacity during peak traffic periods.

The methods of traffic forecasting which are used generally deal with average or peak conditions and do not account for the effects of temporary blockages. The objective of utilizing our large investments in traffic capacity to the fullest generally allows for less and less slack in the system to handle accident related congestion. This is compounded by the fact that in recent years the normal levels of daily traffic congestion have been increasing. Consequently, minor traffic incidents, which previously had only small effect on traffic flow, now have a more noticeable effect on congestion. To the extent that traffic accident rates increase with increasing traffic levels, this problem will continue to increase too.

People's perceptions of the phenomenon of traffic congestion are an important consideration. Commuters generally are unhappy and annoyed about the normal day-to-day congestion they experience. However, they get frustrated and angry when they experience unusual congestion and delay that they have probably not accounted for in their schedules. Consequently, traffic alleviation measures which would lessen the magnitude of periods of unusual incident related congestion would be beneficial even though the measures would not alleviate the day-to-day congestion. It should be made very clear that our estimates of available capacity are made without any allowances for accidents constricting traffic flow. Therefore, expedited clearance of accidents would simply make available capacity which has already been counted on in the setting of development levels. Consequently, such actions would not lead to expectations of further development approvals.

c. Development of Helicopter Traffic Surveillance and Control Service. A demonstration program could be instituted to have a police helicopter available during peak periods for the specific functions of (1) traffic surveillance and monitoring, (2) traffic control, (3) incidence detection, and (4) for expediting clearance of accident scenes and other obstructions. There might even be the potential of linking this service to the control center established for the County's computerized signal system. In Sydney, Australia, a traffic engineer rides in a

helicopter which is used as an observation platform and airborne control center for their computerized traffic signal system. However, it would be recognized that emergency calls for either police, fire, or rescue would take precedence in the use of this service. During non-peak periods, the helicopter could be used for more routine traffic and non-traffic related functions.

There has been a proposal for a permanent program for a public safety helicopter which would have traffic management as one of its functions. It is our understanding that it has been previously recommended by the Police Department but has not been included by the County Executive in the Recommended Budget. The cost of such a program has been estimated by the citizens committees supporting the proposal as having an annual operating cost exclusive of salaries of about \$350,000. Salaries of necessary personnel could double that annual cost. The annual cost of operating a successful and more extensive permanent program over the past three years in Fairfax County is about one and a half million dollars. That program works in conjunction with ground based police, usually on motorcycles, and tow trucks which can be dispatched and directed from the helicopter so as to detect accidents and expedite their clearance.

It is recognized that there are many factors other than alleviation of traffic congestion that ought to be considered by the Executive and Council in a thorough review of the desirability of establishing such a program in Montgomery County.

4. Ridesharing Measures

Exhibit 18 also gives an evaluation of several ridesharing traffic alleviation measures. A general discussion and recommendation follow.

a. Strengthen Staffing of Silver Spring and Bethesda Share-A-Ride Programs. One of the most cost-effective alleviation measures is to strengthen and expand the Share-A-Ride Program in various subareas of the County. Share-A-Ride's personalized matching service has proven to be very successful in influencing commuters to start using carpools, vanpools, and public transit. It has also served as a decentralized information center for other public and private sector ridesharing incentives in the market area.

Sponsored initially by the M-NCPPC, Share-A-Ride began as a demonstration program in Silver Spring in 1979. The program tested the effectiveness of personalized techniques in persuading commuters to share rides. Due to the program's high success rates in Silver Spring, the MCDOT has assumed responsibility for continuing the program in Silver Spring and expanding it to Bethesda.

Over the past year, the opportunities for sharing rides, and the incentives to do so, have increased significantly; however, the effectiveness of the programs in Silver Spring and

Bethesda have suffered because of insufficient staffing levels. A commitment to increase and upgrade the positions of full-time staff members will be essential for fulfilling the program's potential and achieving its trip reduction goals. To help it function as it was originally intended, the County Council has appropriated funds for the following actions in FY 87:

- Two marketing specialists, an office assistant, and a public services intern be assigned full-time to Silver Spring Share-A-Ride; and
- Two marketing specialists, an office assistant, and a public services intern be assigned full-time to Bethesda Share-A-Ride.

The existing Share-A-Ride budget is approximately \$216,000. The incremental cost for increasing and upgrading staff positions is estimated to be \$56,000 in FY 87 and \$75,000 in FY 88. The Council will support further expansion of this effort to the point of diminishing returns.

b. Establish Additional Share-A-Ride Programs in County. The personalized techniques that made the program so successful in Silver Spring can be replicated in other parts of the County. MCDOT has already expanded the program to Bethesda. Private developers have also initiated Share-A-Ride programs in Germantown, Fairland/White Oak, and Rock Spring Park in North Bethesda, and have planned additional programs in the Washington Science Center in North Bethesda and Washington Adventist Hospital in Takoma Park.

Despite the growth of Share-A-Ride thus far, the large majority of the County's residents and employees is not yet served by the program. Each major subarea of the County deserves eventually to have a Share-A-Ride office that provides employer-based as well as residential-based marketing. Based on past experience, subareas with large concentrations of office employees would produce the best results.

Developers have already planned to spend approximately \$240,000 annually for implementing Share-A-Ride services in the Germantown, Fairland/White Oak, and North Bethesda areas. Additional developers are expressing interest in expanding Share-A-Ride services further. Among the subareas with near-term traffic problems, Gaithersburg East is the major one that does not have prospects for private sector funding. Therefore, MCDOT will establish a ridesharing office in Gaithersburg East during FY 87. The cost to operate this office is estimated to be \$125,000 annually.

c. Intensify Promotion of Ridesharing with Advertising. To increase public awareness of Share-A-Ride and other

ridesharing programs, MCDOT expects to increase its marketing efforts by advertising more extensively in the County. The Transportation Alternatives Initiative of MCDOT will concentrate heavily on new marketing and advertising techniques. The MCDOT FY 87 budget includes \$400,000 for ridesharing and transit marketing and advertising, including among other initiatives: radio/television public service announcements, ads in the Montgomery Monthly and New Neighbor Guide, and direct mail campaigns in the I-270 and US 29 corridors. A marketing promotion firm will develop an overall alternative transportation marketing plan (ridesharing, vanpooling, and transit). The effectiveness of this program will be evaluated prior to changing its level of expenditure in FY 88.

d. More Effective Marketing of Regional and Statewide Carpool and Vanpool Programs. It should be recognized that another ridesharing related traffic alleviation measure could be associated with regional and statewide programs for carpooling and vanpooling. The state's Mass Transit Administration has a ridesharing service and the Metropolitan Washington Council of Governments (COG) operates a Commuter Club program. They are programs that primarily attract people who want to carpool to downtown Baltimore and to downtown Washington and the adjacent office areas in Northern Virginia. It is recommended that supplementary County resources not be provided at this time to those programs as a traffic alleviation measure. Rather, continued application of regional and State efforts to maintain and more effectively market these services should be encouraged. As with the ridesharing promotions described in Measure 4c, expenditures on regional and statewide ridesharing marketing should be closely reviewed for effectiveness prior to the future programming of funds.

e. Support For Vanpools. The Council supports vanpooling as a more cost-effective alternative than bus services. It has appropriated \$75,000 for support and assistance to employers and building owners to organize vanpools. Part of these funds may be used as a subsidy to vanpool organizers, owners, and/or riders.

5. Public and Private Transit Measures

Public transportation is historically a basic service provided by all larger metropolitan areas for both overall improved movement of people and as a social program for mobility. Therefore, transit is a well established measure primarily designed to increase people moving capacity in the transportation system. Some service is also designed to serve certain social purposes which might not be otherwise justified on a cost-effective transportation service basis. Private enterprise also provides transit service on a limited basis primarily in areas or markets not served by public transit. Private services are regulated by the government.

Montgomery County has had a typical growth experience with transit service. As urbanization has advanced, the need and desire for providing transit service have increased and been met with a broadening range of service. Basic regional bus service has been supplied by the Washington Metropolitan Area Transit Authority since its consolidation of the area's private operators in the early 1970's. The Authority in the same period embarked on the regional construction of the rail system which has incrementally come on line since the mid 1970's. In 1978 service opened to Silver Spring and in 1984 was extended to Shady Grove. Service will extend to Wheaton in 1989 and to Glenmont in 1994, pending available funds.

The County is actively involved in policy direction of the Authority through representation on its Board of Directors. The County essentially specifies and pays for its desired WMATA bus services and participates in the regional management of the rail system (service levels, fare structure etc.). Transit service has been incrementally improved over the years to expand coverage and increase service frequency to meet and stimulate new ridership demand.

With the anticipation of rail service and its major impact on the transportation system, the County recognized the need to strengthen local and rail-feeder transit services. This led to a decision to pursue a program of County-owned and operated services known as Ride-On. These services were initially provided in the Silver Spring-Takoma Park area prior to the first rail service operation to Silver Spring. The County has continued to expand its local Ride-On service to meet incremental growth in ridership, replace particular Metrobus routes, and expand into new service areas coincident with Metrorail's extension to Shady Grove.

The various types and location of transit services, policies on fares, and service levels have evolved and been adjusted to meet changing needs and conditions. However, with the recent extension of the Metrorail to Shady Grove and significant changes and increase in bus services, a period of transit growth has given way to a transit system that has somewhat stabilized. Recent efforts have focused on evaluating efficiency, reallocating transit resources where needed, and designing specific targeted services to meet specific transportation needs. Most recently the County has taken a much more aggressive and creative approach to employing and encouraging transit as a means of counteracting specific traffic congestion concerns. At the same time, the Planning Commission has pursued strategies to encourage transit-serviceable development and developer-sponsored or supported transit service.

Various specific transit measures have been identified for consideration in the Interim Growth Policy. The measures are summarized in the list on Exhibit 19. The various measures consist of public actions to provide service and facilities, marketing and fare policies and private actions which could

provide or subsidize transit. The list of measures includes those identified in the Consensus Committee Report and additional measures recommended for consideration by staff.

Many of the measures are currently employed to some extent in the County's transportation program. These are expected to continue. Others are new and have differing degrees of short and long term potential toward alleviating congestion. Staff assessment focused on identifying those measures which appear to have greater short term potential for traffic congestion alleviation. This has been approached with an emphasis toward the value of experimentation and evaluation. This approach is necessary and useful because we are seeking to find new and effective ways of encouraging ridership and reducing traffic congestion. The ability to determine or estimate the effect of most measures is constrained by the lack of pertinent data. Therefore, carefully-controlled data collection efforts should accompany all implemented measures to evaluate their effectiveness. This would be extremely useful in making future decisions to expand, abandon, or modify each measure employed. Further discussion of this need for surveying and monitoring the traffic alleviation measures as they are being implemented is given in the next chapter.

In order to identify preferred short-term measures for further serious consideration, three primary criteria were assessed: (1) difficulty of implementation; (2) cost to the public sector and (3) potential impact or effect. The less difficult a measure is to set in motion, the less it costs to the public, and the higher the potential impact on ridership and alleviating traffic congestion, the better a measure rates overall. As discussed earlier, it is expected that MCDOT and WMATA will design some very specific transit programs, projects or services that will implement the general intent of these traffic alleviation measures in the areas of greatest need. The measures deemed most worthy of serious consideration are recommended and summarized below. The remaining measures identified in Exhibit 18 that are not being recommended for immediate attention are not discussed in this narrative. However, they should be kept in mind for further consideration in the future.

- Amend ordinances/regulations to open market to private transportation providers. [Measure 5a(2) and (3)] The County is currently considering revisions to its taxi operation regulations. Regional regulations are also under review to liberalize control over local private transportation providers. These and related regulations should be reviewed to determine the extent to which restrictions could be relaxed or liberalized to improve opportunities for private entrepreneurs to offer private transit services. The potential exists to make it profitable for van operators to charge a fare to transport passengers on fixed or semi-flexible routes, somewhat like a jitney service. This is traditionally regulated or restricted to protect public transits' market share. Some liberalization and experimentation in this area may provide useful new services at no cost to the public sector. It might be necessary in the longer term to adjust or

revise public transit routing to avoid competitive situations and optimize service arrangements.

- Better utilization of Metrorail Park & Ride through fee adjustments and ridesharing. [Measure 5b] Metrorail park-and-ride facilities are a finite resource which should be priced to reflect supply and demand relationship. Where parking is underutilized fees should be lowered. The Consensus Committee recognized this but not the opposite and more prevalent problem--excessive demand. Most Metrorail lots are filling early in the morning peak hours. More parking space is needed but that is not forthcoming.

WMATA is experimenting with measures to encourage carpooling which would produce more passengers per parking space. This should be encouraged. The County Council also recently appropriated \$250,000 for the first stage of an experiment to improve bicycle access and parking at four Metrorail stations. That should divert some park and ride trips to bike and ride, freeing up auto parking for those living beyond convenient cycling distance of the stations.

Another measure to increase transit ridership and provide some traffic congestion alleviation would be incrementally increasing parking fees at high-demand lots. With this approach, more revenue is generated, the pattern of arrivals will spread over a longer period, and, it is assumed, more people will choose to save money and take a bus or a bicycle for their access trip. The net effect should be more rail riders, more bus riders, more revenue and less traffic on the roads. As long as the parking fee is not raised above a level that would leave spaces empty, this strategy should work. Of course, high fees may create a hardship for employees with modest incomes and no practical alternative to driving alone to work.* Finally, parking fees are a regional issue in the administration of the rail system and the policy on this issue may be affected by other, unrelated regional considerations.

- Increase bus frequency and service coverage. [Measures 5c and 5D] To build upon recent ridership gains in Germantown and the US 29 corridor, the County will provide additional service in these areas, specifically: a new route along MD 355 from Urbana/Clarksburg to Shady Grove; new counterflow routes serving the Department of Energy and Fairchild Industries from Shady Grove; new service from the Clopper Road area to the Germantown Marc Station; extending service to the Good Hope Road, Calverton Boulevard/Cherry Hill Road and Greencastle Road areas of the US 29 corridor; and reverse commuting service to White Oak and the Montgomery Industrial Park from the Silver Spring Metrorail station. These increments should cost \$750,000 in FY 87 and

* The County Executive has developed policies for dealing with such problems in order to make carpooling feasible for many County Government employees.

EXHIBIT 19 - EVALUATION OF PUBLIC AND PRIVATE TRANSIT TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
5. <u>Public and Private Transit Measures</u>					
a. Provision of public transportation by the private sector					
1) contracting Ride-On service	L	H	L	#7	yes
2) franchised taxi, van services, or jitneys	H	L	H	--	--
3) amend ordinances/regulations to open market potential.	L	L	M	--	--
b. Better utilization of Metrorail parking through fee adjustments and ridesharing.	L	L	M	[#12]	--
c. Increase bus frequency.	M	M	M	#8a	yes
d. Increase bus service coverage.	H	M	M	#8a	yes
e. Provide discounted transit passes through employers.	M	M	M	#8b	yes
f. Introductory 1 month transit vouchers for new employees/ new residents.	M	L	L	#8d	yes
g. Insure bus shelters exist in congested areas meeting criteria.	H	M	L	#8c	yes
h. Better utilize commuter rail service.	M	M	L	#9	yes

(Continued on next page.)

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
(L=Low M=Moderate H=High)					
5. <u>Public and Private Transit Measures (Cont'd.)</u>					
i. Improve passenger amenities/convenience					
. provide sidewalks and bike paths to bus stops					
. telephone information					
. schedule availability	M	M	L	--	--
. fare media sales locations					
. bus comfort level					
. child care facilities at Metro					
. install bicycle racks on buses on selected routes.					
j. Provide periodic free transit service or passes to encourage trial usage.	M	L	H	8d	yes
k. Targeted fare policies to encourage ridership.	M	M	H	--	--
l. Targeted marketing efforts to promote transit use in areas needing traffic congestion alleviation.	M	M	M	--	--
m. Develop operational improvements and tailored services to enhance transit convenience and travel times					
. HOV preferential treatments	M	M	H	[#16b]	no
. express bus services.					
n. Provide commuter fringe parking lots in conjunction with existing or new express transit services using public or private property.	M	M	M		

\$920,000 in FY 88. Looking to the future, a preliminary engineering study of the East-West Transitway will be conducted in FY 87, costing an estimated \$250,000.

- Provide discounted transit passes through employers. [Measure 5e] With a development pattern dominated by automobiles, parking is largely viewed as a benefit where it is provided free-of-charge by an employer. Outside the four locations in the County where there are Parking Lot Districts, parking facilities are required development features. Some means needs to be found to encourage or require employers to provide benefits equivalent to those given auto drivers (generally free parking) to all employees--specifically, those choosing to use transit, bicycles, ridesharing, or walking. Two basic options exist, either charging a market rate for parking or subsidizing some transit fare. With this measure focusing on existing employers, an incentive could be a shared-discount between the County and the employer. That is, the County could agree to provide transit passes and rail fare cards at say a 15 percent discount to employers who would agree in turn to sell them at an additional 15 percent discount to employees. This would result in a substantial total discount of 30 percent to employees. A "shared-discount" program of this type will be developed by the County. The extent of the discount and the administration of the program will be determined.

Employer-based transit fare discount programs exist in the public and private sector on a very limited basis and appear to be effective. With the new twist of a shared public/private discount, a very effective means of getting the actual cost of transit lowered to the user would be achieved without across-the-board fare cuts. These "selective" fare cuts would also stimulate ridership in a targeted manner. A trial program of this nature could quickly indicate the potential effect on generating new transit users by monitoring sales and surveying users. Other incentives need to be determined to expand the attractiveness of this measure to employers. Development of a Metrorail pass is another concept that merits consideration, it could then be made available in the proposed employer-based discount transit pass programs.

- Provide periodic free transit service or passes to encourage trial usage. [Measure 5j] A free product trial is an established marketing measure to generate new, continuing business. The concept has been used, to a limited extent, in transit and with noticeable success. This should not be limited just to introductory or new services but more importantly be employed periodically on existing services. The proposal is to provide, on a rotating basis, a two-week or one month period of free service on targeted routes. Low and medium-productive routes are likely candidates. Each month a different set of routes would be selected and offered free-of-charge service coincident with a comprehensive, targeted marketing program to alert potential users. Even a modest incremental increase in permanent new riders could "amortize" the investment in short-term revenue

loss. Such a program should involve both Metrobus and Ride-On. Permanent free services are attractive but expensive, and the Council has therefore decided that free services should not be continued for more than 90 days on any route unless specifically approved by the Council. Experience indicates that convenient service is more important than cost, in determining transit usage.

- Targeted Fare policies to encourage ridership. [Measure 5k] The cost to ride transit is certainly a factor of concern to the patron. A fair charge for reasonable service is expected. A higher charge for high quality, high demand service is tolerated. Across-the-board fare reductions could stimulate ridership and divert travel to transit from auto use. However, selective or targeted fare policy changes are likely more useful to specific objectives and have more predictable revenue implications in the short term. There are a variety of fare policy changes which merit consideration and some might be instituted only on a trial basis.

Selective "fare relief" in certain areas or corridors might be a worthwhile experiment to determine impact and to achieve improvement in problem areas. This should not be restricted to bus transit but include rail fare considerations as well. In particular, intra-County and reverse commute trips on rail are too expensive for the suburban market within which they operate. Consideration should be given to reducing fares on reverse commuting trips, since these trips use excess capacity which goes to waste in great part. Also, long-term consideration should be given to equalizing Metrobus and Ride-On fares and further discounting rail-to-bus charges selectively or systemwide. A study will be made of inaugurating a monthly Metrorail pass, discounting the price and providing extra convenience for the Metro patron, which should be a further inducement to ridership.

- Targeted marketing efforts to promote transit use. [Measure 5l] The County and WMATA have strengthened transit marketing efforts and this should continue. This measure is especially important in conjunction with several of the other alleviation measures. Information and promotion are necessary to achieve success in attracting ridership to service which may be otherwise unknown or mysterious to potential users. The cost effectiveness of such efforts is often uncertain. Therefore, to be most effective, marketing should be targeted to specific ridership efforts and monitoring should be designed to evaluate results. General advertising campaigns have some merit but are difficult to evaluate and are not effective in stimulating specific ridership objectives. Targeted marketing efforts, such as those directed toward underutilized routes and new services, should dominate a marketing program to maximize specific results.

- Operational improvements and tailored services to improve transit convenience. [Measure 5m] Convenience is probably the most important determinant in transit usage. Therefore, there is an ongoing need to review services and make improvements

in convenience. Various factors affect convenience but travel time is paramount. Improvements in traffic flow, frequency of service, and express operations are examples of actions to shorten travel time. Continued attention should be given to identifying potential improvements and tailoring services to make transit a more attractive and convenient service. Recent examples are express and shuttle operations and, of course, frequency improvements. Other examples include traffic operational changes to provide preferential treatment for buses and carpools such as bus lanes and traffic signal preemption. A program of continued innovation should be a component of the overall transit program. These improvements should be viewed as experiments and treated accordingly to allow flexibility in designing the most successful services. Correctly tailored services and traffic improvements will generate ridership and reduce vehicular traffic. One improvement that can be implemented this fall is the use of the southbound shoulder of I-270 between MD 124 and Shady Grove Road as an exclusive lane for buses. Furthermore, there will be studies examining (1) the feasibility of high occupancy vehicle lanes for bypassing congestion of the MD 355 bridge in Gaithersburg, (2) the provision of bus priority systems in the Bethesda and Silver Spring Business Districts, and (3) provision of bus/HOV priority systems on East-West Highway between Bethesda and Silver Spring CBDs.

● Provide commuter fringe parking lots. [Measure 5n]
The County should continue to develop parking lots for carpool formation and bus park-and-ride. Existing lots have been most successful where express transit service is available. Therefore, new lot development should be accompanied with express service to Metrorail or large employment centers.

MCDOT should pursue negotiations with owners of existing parking lots that are not fully utilized during weekdays and which are near existing transit services. This would include church lots and large shopping center lots. While such a traffic alleviation measure would not require capital expenditure, MCDOT must be prepared to agree to provide or pay for some future maintenance costs for these private lots.

The commuter parking lots need not be very large; indeed, a number of small lots scattered through a residential area might be more convenient for the riders than one large lot, nor need the lots be visible from main highways.

The County Executive has recommended that two new fringe lots be constructed in FY 88. The White Oak lot, at New Hampshire Avenue and Columbia Pike, could accommodate 450 cars and would be served by express bus service to the Silver Spring Metrorail Station. The Glenmont lot at the future Glenmont Metrorail station could hold 300 cars. The construction cost of the two lots will be about \$2,600,000. The Council may approve these projects at a later date.

6. Bicycling and Pedestrian Measures

Although Montgomery County residents and workers are very dependent on the automobile for mobility, everyone is a pedestrian at least some of the time and a substantial portion of County residents use bicycles on at least an occasional basis for recreation or local travel. About three percent of County residents walk as their principal means of commuting to work. About one-half of a percent of residents use bicycles as their principal commuting mode. Two to three times this number of residents use these non-motorized modes occasionally for commuting and many more rely on walking or bicycling to get to and from public transportation services for commuting. Some of these percentages may be higher in various subareas of the County, for example, nearly 5 percent of the workers for the Silver Spring Business District walked or biked to work in 1979 according to surveys conducted for the Metro After Study.

Problems with a lack of public facilities serving non-motorized travel demand rarely capture headlines because these problems tend to be very localized, despite their widespread occurrence, and because non-motorized travelers remain largely unorganized politically. Nevertheless, the shortage of public facilities for bicycle and pedestrian transportation tends somewhat to exacerbate road congestion problems by discouraging the use of non-motorized modes for local travel and for transit access. Having our transportation system offering a greater diversity of modal choices is important to cost-effective congestion alleviation. Several traffic alleviation measures related to focused bicycling and pedestrian improvements are evaluated in Exhibit 20.

Montgomery County in the past has been among the leading municipalities in the eastern United States integrating bicycling into its transportation programs. However, in the last several years, spending levels and staffing devoted to bicycle transportation have fallen. Road widenings and reconstruction projects that could, at relatively low cost, provide enhanced bicycle and pedestrian facilities, have in many instances not included them.

a. Accelerate Construction of Bicycle and Pedestrian Facilities. Planned County capital spending for FY 87-92 includes \$2,143,000 for pedestrian facilities, \$3,850,000 for the Bethesda streetscaping improvements, and \$475,000 for bicycle facilities. This expenditure level for bikeways represents 0.1 percent of total transportation expenditures, although the portion of work trips made by bicycle is more than five times greater than this. In light of near-term congestion problems, bicycle and pedestrian improvement projects that could help in diverting peak period automobile trips to non-motorized modes should be identified. Such projects should be given a higher priority and put on an accelerated funding schedule. Any potential staffing constraints should also be identified and provided for. To expedite the planning and design of bikeway projects, consultant assistance should be contracted with the sole

responsibility of planning, designing, and managing the construction of bike paths. This will allow the production of bikeway projects to be improved and more projects to be implemented in later years of the Capital Improvements Program; and enable the programming and development of bikeways and other bicycle related capital facilities on an accelerated schedule. Funds currently scheduled to be expended over six years should be expended within the next year or two. Funds for sidewalk development and repair should be similarly accelerated where possible. The identification of appropriate additional bicycle and pedestrian improvements to be built in the later years of the next CIP should be given priority by MCDOT staff, in consultation with M-NCPPC staff and interested County bicyclists and residents. An emergency appropriation of \$50,000 will be considered to procure this consultant support.

b. Ensure that All Development and Road Construction Provide Bicycle and Pedestrian Facilities. To maximize future opportunities for non-motorized travel in the County, with both short and long term positive effects on congestion, better efforts should be made to insure that all major new development and all County road projects provide sidewalks and incorporate well designed bicycle facilities. These bicycle facilities should provide spatial separation from motorized traffic to neighborhood shopping areas, nearby points of express transit access, and nearby bicycle facilities that are in existence, programmed, or included in area master plans. The County Road Code currently provides for bikeways and sidewalks in prescribed situations.

c. Develop Personalized Bicycle and Pedestrian Commuting Demonstration Programs. Funds should be provided for FY 88 to develop a personalized bicycle pedestrian commuting demonstration program either in the M-NCPPC or MCDOT. This program would be analogous in approach to the Planning Board's highly successful Silver Spring Share-A-Ride program, which focused on marketing carpooling. This demonstration program would work with area employers, civic associations, bicyclist organizations, ride-sharing coordinators, and the development community to encourage walking and bicycling, especially for commuting to work and school. The program's staff would encourage the provision of bicycle and pedestrian infrastructure (sidewalks, bikepaths, short-cuts for non-motorized travel, secure bicycle parking, workplace showers, directional signs) and marketing/educational program (information on routes, cyclists and driver education, employer-sponsored incentives for bicycle and pedestrian commuting). The demonstration program staff would also identify key barriers to non-motorized transportation and suggest possible solutions to the County DOT, M-NCPPC, and the consultant retained to help expedite the planning and development of bicycle projects.

d. Develop Guarded Bicycle Parking Garages at Metro Stations and Improve Access Routes. This project has already been funded at a level of \$250,000 in FY 87 and will require concerted staff attention for success. Improvements to bicycle

EXHIBIT 20 - EVALUATION OF BICYCLE AND PEDESTRIAN TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
(L=Low M=Moderate H=High)					
6. <u>Bicycle and Pedestrian Measures</u>					
a. Accelerate construction of programmed bicycle and pedestrian capital projects, compressing 6 years of funding into next 2 years.	M	M	L	--	--
b. Ensure that development and road construction provides bicycle and pedestrian facilities	L	L	L	--	--
c. Hire bikeway design consultant.	L	M	M	--	--
d. Provide guarded bicycle parking garages at 4 (low) or 8 (high) Metro stations in Montgomery County, including operating costs and capital costs.	M	M	M	[#16d]	yes
e. Promote use of existing bicycle lockers at Metro stations	L	L	L	--	--

access to Metro offer capabilities of reducing a significant number of peak hour trips from throughout the County in the near-term with development of guarded bicycle parking at all Metro stations. These improvements would (a) divert existing auto drivers to use bicycles in combination with transit for home end access to Metro, (b) free up new spaces in filled park-and-ride lots, and (c) provide opportunities for workers to get from Metro stations to employment centers otherwise poorly served by public transportation. Additional capital and operating funding of \$2,300,000 would be needed for full implementation of these improvements in the FY 87-88 period. Lesser amounts of additional funding could be concentrated in those areas requiring the most congestion alleviation, such as the Shady Grove and North Bethesda area stations.

e. Promote Use of Existing Bicycle Lockers at Metro Stations. Immediately, steps should be taken to make existing bicycle lockers at Metro stations free of charge, other than a key deposit. A campaign should be initiated to market bike-and-ride commuting to Metro users and those living and/or working more than 1/4 mile and less than 2 miles from Metro stations. This marketing should involve area ridesharing coordinators, those engaged in employer-provided commuter transportation programs, WMATA, and MCDOT staff. Billboard campaigns to promote transportation alternatives should incorporate promotion of bicycle access to and from Metro at home and work place trip ends. This work could be funded out of the existing \$250,000 appropriation for bicycle access improvement.

EMPLOYMENT AREA MEASURES

7. Parking Measures

Exhibit 21 presents an evaluation of traffic alleviation measures related to changes in parking privileges and rates. Issues related to changes in parking can become very intense and changes in parking privileges and rates can have some significant effects in changing travel behavior. However, many of those changes tend to be viewed as disincentives and therefore need to be carefully thought out prior to any changes being made. Some general ideas and information related to these measures follows.

b. Increased Parking Charges. MCDOT is in the process of increasing the public parking rates in the Silver Spring and Bethesda Parking Lot Districts. The rates for long-term commuter parking will rise this year from the existing rate of 15 cents/hour to 25 cents/hour, and next year to 30 cents/hour. MCDOT concedes that the phased increase will not be great enough to dissuade a significant number of commuters from driving alone to work.

The County's original plans to increase rates to a range of 45 to 50 cents/hour, however, would have resulted in a measurable impact on transportation mode choice. Such an increase could have been implemented in conjunction with: (a) attendant-

EXHIBIT 21 - EVALUATION OF PARKING TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
(L=Low M=Moderate H=High)					
7. <u>Parking Measures</u>					
a. Imposition of parking fees for County, Bi-County, and Board of Education employees in County office building garages or lots in traffic congested areas.	H	L	L	#10	no
b. Increased and rationalized fees in private and public parking lots, garages and street meters.	H	M	H	#11	yes
c. Place tighter limits or ceilings on public parking supply in Parking Lot District Areas.	H	L	H	[#16c]	no
d. Expansion of the "Get In" Program to Bi-County and Board of Education employees working in traffic congested areas.	M	L	L	--	--
e. Consider County legislation requiring private employers to take actions designed to increase the attractiveness of alternative transportation.	H	M	H	--	--

operated garages, (b) elimination of monthly parking convenience stickers, (c) substantial parking rate discounts for carpoolers, (d) peak period parking rate surcharges, and (e) progressively higher parking rates for each additional hour parked. The income generated would have far exceeded the expenses of implementing such a parking management strategy.

Under the rate schedule that the County chose to implement this year, a monthly convenience sticker will cost \$45. Monthly carpool stickers will be \$40 for 2-person carpools, \$30 for 3-4 person carpools, and free for carpools or vanpools of 5 or more people. The County expects that the income generated by the new rate schedule will approximately cover capital and operating costs of the Parking Lot Districts.

c. Impose Limits on Parking Supply in Parking Lot Districts. An additional longer-term measure that the County could implement in Parking Lot Districts is to place limits on the supply of public parking. Current policy is to provide sufficient parking spaces to satisfy the theoretical demand for such spaces. The County could establish a new policy of satisfying the full short-term shopper/visitor parking demand, but only a certain proportion of the long-term commuter parking demand. Boston and San Francisco are examples of cities which have adopted such a policy.

d. Expansion of the "Get In" Program to Bi-County and Board of Education Employees Working in Traffic Congested Areas. The County is setting an example by establishing a subsidy program for County employees at the County Government Center in Rockville. The new program is called "Get-in." It basically provides for a \$15 per month subsidy towards the purchase of Metrorail fare cards, Metrobus or Ride-On transit passes, commuter rail tickets, or vanpool fees if the employees switch from driving alone to either public transit or vanpools.

It is recommended that this "Get-in" program be expanded to cover Bi-County, Board of Education, and Montgomery College employees working in traffic congested areas. While such a traffic alleviation measure should have a low-to-moderate impact in alleviating traffic congestion, such a commitment by the local government will be helpful in working with the private sector to establish similar programs with their employees. It might also lead to a renewed effort to have commercial parking rates at federal offices in the County and Washington region. Before that program was stopped as a result of a suit brought by federal employees in the early 1980's, it was having a very beneficial effect in promoting transit use and ridesharing throughout the Washington region.

e. Consider County Legislation Requiring Private Employers to Take Actions Designed to Increase the Attractiveness of Alternative Transportation. An important policy consideration involves the supply and cost of parking at different land uses. The ample supply and low (and often free) cost parking at employ-

ment sites in the County unfortunately provides commuters a strong incentive to drive alone to work. It not only perpetuates the perception by commuters that driving to work is easier and less costly than taking public transit, but also discriminates against commuters who choose more efficient ways of getting to work.

A task force, including representative of both the government and the private sector, should be established to study alternative ways to induce private sector employees to utilize transit, including: minimum parking charges; minimum transit subsidies; preferential carpool parking; revision to the parking requirements in the zoning ordinance; etc.

In FY 87 a North Bethesda Pilot Study, to be funded jointly by the County and the private sector, will evaluate means by which current and future employees can achieve reductions in vehicle trip generation through a transportation management association. The conclusions may be applied to other areas where the master plan road systems have been supplied, but where congestion persists.

8. Employment Activity Measures

The characteristics of employment centers and the policies of employers towards providing subsidies, services, or other incentives or disincentives related to employee commuting have a major impact on auto driver trip attraction rates. Employment located in high density areas, with diverse proximate services, frequent public transportation, superior facilities for bicycle and pedestrian travel, high auto parking costs, tight auto parking supply, and publicly or privately supported programs encouraging alternatives to the automobile, will have far lower auto driver trip attraction rates than employment without such characteristics. Employment located in isolation from other offices and services, with free parking for employees, less than frequent bus service to transit stops which are more than several minutes walk from the job site across vast parking lots and busy highways, with inadequate pedestrian and cyclist facilities, and no secure parking for bicycles, will have higher auto driver trip attraction rates than employment without these characteristics.

While there is much that the public sector can do to alleviate traffic congestion, there is also considerable potential for private sector involvement. Employers can have a significant effect on peak-hour auto driver trip attraction rates related to their job site beyond the transportation system and site characteristics described above.

a. Intensify Negotiations with Employers and Developers for Alternative Services and Altered Work Hours. Developers have already been negotiating with the Planning Board and MCDOT staff to provide privately-sponsored trip reduction programs as conditions of approval for new developments. The programs are meant to compensate for the peak hour trips generated by the proposed

EXHIBIT 22 - EVALUATION OF EMPLOYMENT ACTIVITY AND OTHER EMPLOYMENT AREA TRAFFIC ALLEVIATION MEASURES

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Evaluation Criteria			Number From the Consensus Committee Report	Previously Endorsed by the County Council
	Difficulty of Implementation	Cost to the Public	Potential Impact or Effectiveness		
8. <u>Employment Activity Measures</u>					
a. Intensify negotiations and provide County financial incentives for existing large employers in the County to arrange flextime or staggered work hours.	H	H	H	#4	yes
				#5	yes
				#6	yes
b. Employer-provided shuttles to Metrorail.	H	H	M		
c. Provide County financial incentives for employer provided vanpools.	M	L	M	#3	yes
9. <u>Other Employment Area Measures</u>					
a. Establish automobile restricted zones and/or traffic cell systems in portions of the Silver Spring, Bethesda, and Rockville CBD's in order to develop pedestrian and transit only streets or improved non-motorized circulation.	H	H	M	--	--

developments. Some of the trip reduction programs approved thus far include privately-operated Share-A-Ride programs, transit shuttle services to Metrorail stations, subsidized vanpool services, and discounted transit pass programs. Such programs have considerable value in permitting desirable new development in areas with inadequate road capacity. New programs should be explored related to adoption of staggered working hours or flex-time at job sites and employer-sponsored programs encouraging bicycle commuting, walking to work, and bike-and-ride commuting, which might include providing secure overnight bicycle parking and/or inexpensive rental bicycles at Metro Stations for egress to work sites.

Staggered working hours and flexible working hours offer promise for substantial reductions in peak hour traffic problems by shifting trips from the peak period to the shoulders of the peak. The initial attempts of the County DOT in this area, however, have had only limited success. Few major employers have been willing to voluntarily alter their business hours or practices. Increased efforts must be made by the County Executive in this area.

b. Employer-provided shuttles to Metrorail. Similar to the concept of employer-sponsored vanpools, this proposes using vans to shuttle between a specific employment site and a nearby rail station, or directly between the site and residential neighborhoods. The employer would design, sponsor, and operate the service, tailored to employee needs. Employment locations just beyond walking distances to rail stations would be likely candidates. Some incentive is likely necessary to encourage employers to participate in such a program. The incentives would be different for established versus proposed employment centers. The County might consider making vans available to existing employers in exchange for their commitments to operate peak hour shuttle service. This would encourage rail ridership but might affect existing bus ridership depending upon selected locations. This measure should be considered where public transit is not available; competition between employer shuttle service and public transit should be avoided to allow for the most efficient use of transportation resources.

c. Provide County Financial Incentives for Employer Provided Vanpools and Other Alternative Transportation Services. Persuading existing building owners and major employers to voluntarily implement vanpool programs and other alternative transportation services would take considerable effort, but may be easier to accomplish if financial incentives are offered by the County. For instance, to help persuade existing large employers to establish vanpools and to provide a \$15/month subsidy on vanpool fares, the County could offer a "matching" subsidy of \$15/month for each vanpool passenger. Similarly, the County could sell transit passes at a discount to employers that are willing to offer employees a "matching" discount on the passes.

There may also be opportunities to provide credits toward local taxes for employers that implement such measures as parking constraints and charges, "transportation allowances," reserved carpool spaces, variable work hours, shuttle services, or bicycle parking facilities and showers.

A program of intensified negotiations with major employers in the County would require a team of three to four full-time marketing specialists. The cost of providing sufficient staff and funding a subsidy program could be \$550,000 to \$750,000 annually, depending on the strength of the County subsidy, and other aspects such as the degree to which current vanpool users and other alternative services are included.

Given these moderate to high costs to the public and the moderate to hard expected difficulty in attempting to implement, for these measures more of an experimental or targeted approach seems desirable. For example, in FY 87 MCDOT may want to experiment with a partial program of providing County financial incentives for employer provided vanpools and alternative services. This could be tried with a few employers in areas most in need of congestion alleviation. With proper monitoring of the results of the incentive program, a subsequent decision could be made to carry out a more intensified and extensive program in FY 88.

9. Other Employment Area Measures

There have been efforts in other cities and urban areas to create what is felt to be a more balanced transportation system by reallocating street space within their urban core areas to favor transit, pedestrians, and bicycles. The planning done in Montgomery County as part of the Metro station area planning, and in conjunction with the recent streetscape programs, has generally examined the applicability of reallocating existing street space in Montgomery County. Such efforts could be a direct disincentive for automobile travel and thereby help alleviate somewhat traffic congestion or could be viewed as just redistributing it to locations where it is more manageable. To the extent that such reallocations of street space induce shifts in travel mode, then these measures would tend to alleviate traffic congestions.

a. Establish Automobile Restricted Zones and Traffic Cell Systems. A well-established and very effective method for enhancing alternatives to the automobile, very common in Europe and Japan, is the "traffic cell" system. Traffic cells divide an area such as an urban business district or major activity center into different zones which are separated by boundary streets. Although single passenger automobiles are barred from crossing these boundary streets, cyclists, pedestrians, buses, and taxis can all cross these streets unimpeded. Automobile drivers desiring to cross these boundaries must travel circuitous routes using major streets that circle the traffic cell system. By means of this approach, local travel by means other than automobiles is

encouraged. The experience in the downtown area of many cities has shown that, when combined with improvements in public and non-motorized transportation, traffic cells lead to major auto traffic reductions (20 percent is typical). Although traffic cells have been the subject of major controversy in most cities and towns considering them, after implementation, they have won widespread support from business and community interests for their positive impact on the quality of life, property values, and business levels. The Downtown Crossing project in Boston represents a partial traffic cell system and has been quite successful in promoting transit use and reducing automobile traffic in the central area of Boston.

The development of experimental traffic cell systems in the central areas of Bethesda, Silver Spring, or Rockville could be expected to reduce the amount of traffic within these subareas by perhaps as much as 10 to 20 percent. Necessary peripheral diversion routes and enhancements to transit and non-motorized transportation would be needed. Combined with other alleviation measures, development of such traffic cells would also reduce upstream traffic demand offering major reductions in congestion in the US 29 and I-270 corridors that feed into these central areas. Such traffic cells could help the County enhance the quality of urban-suburban living by promoting an environment less dominated by the automobile.

Either in combination with traffic cells or alone, the creation of automobile restricted zones and pedestrian streets is another alleviation measure that could work to divert peak hour automobile trips to other modes of travel while enhancing the quality of urban and suburban life in the County. The experience of several American cities has shown that such zones work in a synergistic fashion with improvements to transit and non-motorized travel, yielding measurable reductions in traffic congestion.

CHAPTER IV: ANALYSIS OF TRAFFIC ALLEVIATION MEASURES AND RECOMMENDATIONS FOR IMPLEMENTATION IN FY 86-87

This concluding chapter of the Interim Growth Policy Report first presents the results of a comparative analysis of the potential traffic alleviation measures. The results of that analysis are arranged against the traffic alleviation measures which are recommended for implementation in FY 87 and FY 88. Next, there is an assessment of which Policy Areas would benefit most from the recommended traffic alleviation measures. The approximate cost ranges for the groupings of recommended projects are then presented and an assessment of the effect of the recommended measures on projected near-term LOS conditions is also given. This report also presents recommendations to improve programs that can be used to monitor LOS conditions, the effectiveness of the implemented traffic alleviation measures and transit use.

It should be emphasized that the recommendations in this chapter are intended only to reduce short-term traffic congestion. They do not address the problems of long-term congestion or inadequate thresholds, or the significant non-transportation facilities issues (e.g., school congestion). These items and other growth issues will be addressed in the context of the Annual Growth Policy mandated by County Law. The following recommendations also omit discussion of the numerous alleviation measures which have been initiated by the County Executive since these efforts are already underway.

A. A Comparative Analysis of the Potential Traffic Alleviation Measures

Exhibits 17 to 22 presented in the previous chapter gave a judgmental evaluation of each of the potential traffic alleviation measures in accordance with three evaluation criteria: 1) relative difficulty of implementation, 2) relative cost to the public, and 3) the relative potential impact or effectiveness of each of the measures in alleviating traffic congestion. Exhibit 22 presents the results of a comparative analysis of the potential traffic alleviation measures by giving two cross-tabulation matrixes of the evaluation criteria. In the first cross-tabulation matrix, the assessment of the relative effectiveness of each measure in alleviating traffic congestion is arrayed against the assessment of the relative costs to the public purse. The second cross-tabulation matrix gives a comparison of the same assessment of the relative effectiveness of each measure in alleviating traffic congestion by arraying it against the assessment of the relative difficulty of implementation of each measure by the public sector. Each of the potential measures is given once in each of the two matrixes and is identified by its reference number. Exhibit 24 has been prepared to assist the reader in understanding Exhibit 23. Exhibit 24 presents the full list of the potential alleviation measures discussed in the previous chapter for reference purposes. The traffic alleviation measures

Relative
Effectiveness
in Alleviating
Traffic
Congestion

High

Moderate

Low

1a 1b 8a	2b (4b) (5k) (5m) 7b (7e)	(4a) 5a2 (5j) 7c
2d 8c 9a	2c (4e) 5c 5d (5e) (5l) (5n) (6c) 6d 6f	(5a3) (5b) (8b)
3b 3c 5a1	3a 4d 5g 5h 5i 6a	2a (4c) 5f 6b 6e 7a (7d)

High

Moderate

Low

Relative Cost to the Public

High

Moderate

Low

1a 1b 2b 5a2 7b 7c (7e) 8a	(4b) (5j) (5k) (5m)	4a
2c 5d 8c 9a	2d 5c (5e) (5l) (5n) (6c) 6d (8b)	(4e) (5a3) (5b) 6f
3a 3b 3c 5g 7a	2a 5f 5h 5i 6a (7d)	(4c) 4d 5a1 6b 6e

High

Moderate

Low

Relative Difficulty of Implementation

○ = Recommended Traffic Alleviation Measure for Initiation in FY 87.

Exhibit 23. Relative Comparison Among Traffic Alleviation Measures with Regard To Effectiveness, Cost to the Public, Ease of Implementation, along with Measures Recommended for Initiation in FY 87.

Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures	Traffic Alleviation Measures Grouping and Description of the Traffic Alleviation Measures
1. <u>Automobile Ownership Measures</u>	5. <u>Public and Private Measures</u>	6. <u>Bicycle and Pedestrian Measures</u>
a. Enhanced alternatives to the automobile. b. Impose County auto registration fees or area license.	a. Provision of public transportation by the private sector. 1) contracting Ride-On service. 2) franchised taxi, van services, or jitneys. 3) amend ordinances/regulations to open market potential.	a. Accelerate construction of programmed bicycle and pedestrian capital projects, compressing 6 years of funding into next 2 years.
2. <u>Trip Generation and Distribution Measures</u>	b. Better utilization of Metrorail parking through fee adjustment and ridesharing.	b. Ensure that development and road construction provides bicycle and pedestrian facilities.
a. Implement marketing and educational programs to lessen vehicular trip generation rates	c. Increase bus frequency.	c. Hire bikeway design consultant.
b. Impose odd/even licensing scheme.	d. Increase bus service coverage.	d. Provide guarded bicycle parking garages at 4 (low) or 8 (high) Metro stations in Montgomery County, including operating costs and capital costs.
c. Develop street design to shape the travel environments of neighborhoods.	e. Provide discounted transit passes through employers.	e. Promote use of existing bicycle lockers at Metro stations.
d. Offer incentives to reduce work trip lengths.	f. Introductory transit vouchers for new employees/new residents.	7. <u>Parking Measures</u>
3. <u>Private Automobile Measures</u>	g. Insure bus shelters exist in congested areas meeting criteria.	a. Imposition of parking fees for County, Bi-County, and Board of Education employees in County office building garages or lots in traffic congested areas.
a. Increased use of automation in traffic systems.	h. Better utilize commuter rail service.	b. Increased and rationalized fees in private and public parking lots, garages and street meters.
b. Establishment of an improved system for expedited clearance of traffic accident scenes, stalled vehicles and other obstructions of traffic flow.	i. Improve passenger amenities/convenience. • provide sidewalks and bike paths to bus stops • telephone information • schedule availability • fare media sales locations • bus comfort level • child care facilities at Metro • install bicycle racks on buses on selected routes.	c. Place tighter limits or ceilings on public parking supply in Parking Lot District Areas.
c. Installation of helicopter evacuation and traffic control service by the Montgomery County Department of Police.	j. Provide periodic free transit services or passes to encourage trial usage.	d. Expansion of the "Get In" Program to Bi-County and Board of Education employees working in traffic congested areas.
4. <u>Ridesharing Measures</u>	k. Targeted fare policies to encourage ridership.	e. Consider County legislation requiring private employers to take actions designed to increase the attractiveness of alternative transportation.
a. Strengthen staffing of Silver Spring and Bethesda Share-A-Ride programs.	l. Targeted marketing efforts to promote transit use in areas needing traffic congestion alleviation.	8. <u>Employment Activity Measures</u>
b. Establish additional Share-A-Ride program in the County.	m. Develop operational improvements and tailored services to enhance transit convenience and travel times. • HOV preferential treatments. • express bus services.	a. Intensity negotiations and provide County financial incentives for existing large employers in the County to arrange flextime or staggered work hours.
c. Intensify promotion of ridesharing with advertising.	n. Provide commuter fringe parking lots in conjunction with existing or new express transit services.	b. Employer-provided shuttles to Metrorail.
d. More effective marketing of regional and statewide carpool and vanpool programs.		c. Provide County financial incentives for employer provided vanpools.
e. Direct subsidy for vanpools.		9. <u>Other Employment Area Measures</u>
		a. Establish automobile restricted zones and/or traffic cell systems in portions of the Silver Spring, Bethesda, and Rockville CBD's in order to develop pedestrian and transit only streets or improved non-motorized circulations.

which are recommended for initiation in FY 87 and FY 88 are highlighted in Exhibit 23 by having a circle placed around the number of the measure as given in Exhibit 24.

As can be seen in Exhibit 23, the traffic alleviation measures which are recommended for initiation in FY 87 and FY 88 tend to be clustered towards the right and upper parts of the two matrixes. That is a desirable result. The recommended measures should be among the more effective ones in alleviating congestion by having been rated as ranging from moderately to highly effective. In addition, they are also more worthy of initial attention to the degree that they have relatively moderate to low costs to the public and are low to moderately difficult to implement. As also can be seen, there are some potential alleviation measures being recommended that are somewhat outside the two main clusters. It is felt that in terms of the combination of the criteria those particular ones should also be initiated in FY 87 and FY 88.

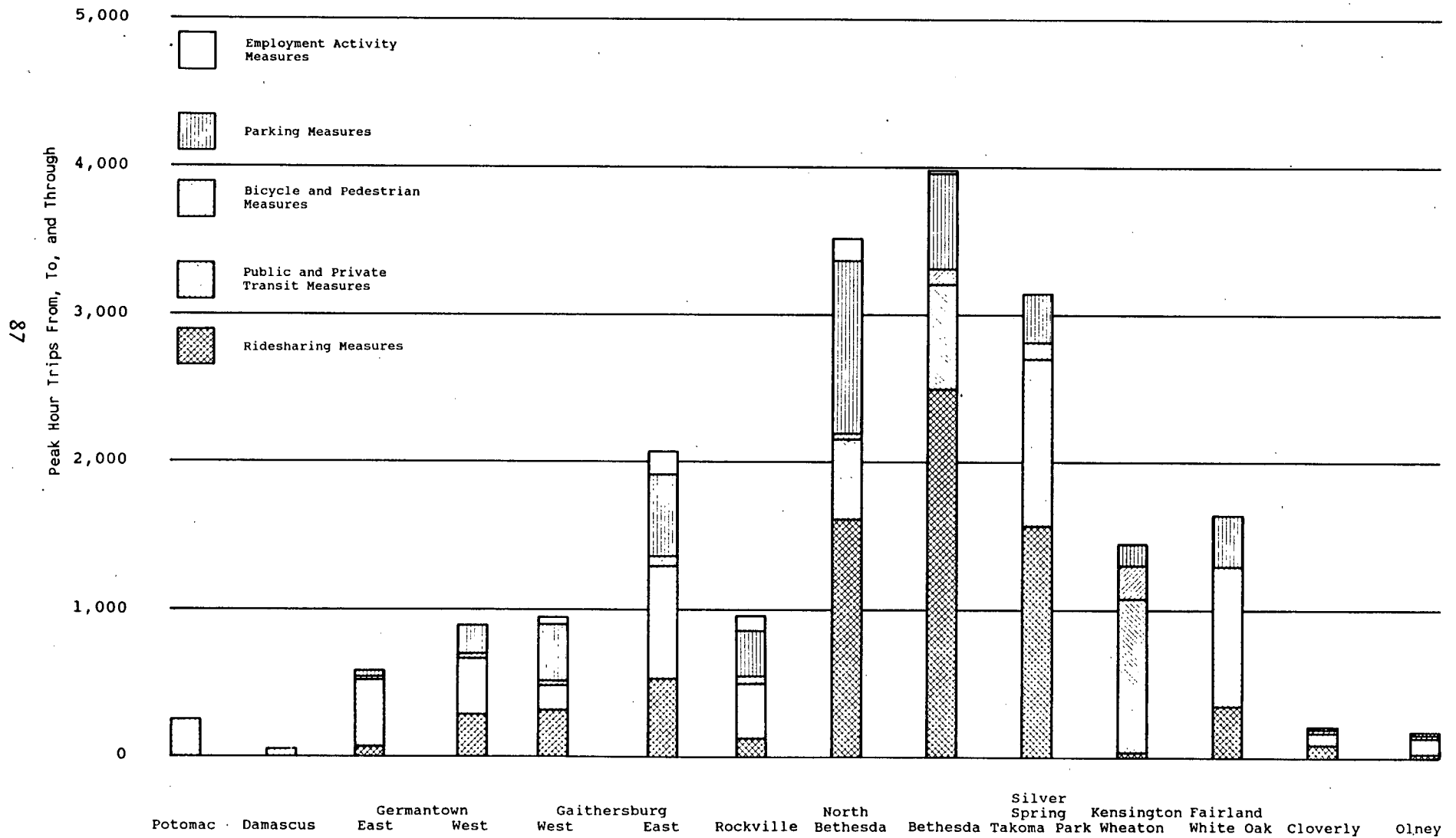
The matrixes in Exhibit 23 also give some indications which can be helpful in considering additional traffic alleviation measures beyond those which are recommended in this Report. For example, additional measures could be selected which would have a high difficulty of implementation but could be moderate to highly effective in alleviating congestion. Perhaps those are measures to which attention should be given in FY 88 and FY 89 after the initial groups of recommended measures are proceeding towards implementation. Alternatively, additional measures could be selected which would have low effectiveness but that would have low or even moderate costs and would be less to moderately difficult to implement. That would be the "direction one would want to go in" within the matrix in order to select additional measures for initiation in FY 87 and FY 88.

It is recognized that these evaluation matrixes and their underlying criteria can be viewed as a subjective exercise. However, it is felt that they can be used as a working tool by the decision-makers and general public to provide some perspective and consistency to the evaluation of a very complex subject.

B. An Assessment of Which Policy Areas Benefit Most From the Traffic Alleviation Measures

Exhibit 25 shows an estimate of which policy areas would benefit most from the intensive application of most of the recommended traffic alleviation measures. The height of the bars in this exhibit represents an estimate of the peak hour trip demand from, to, and through each of the areas which would be reduced by the recommended traffic alleviation measures. Please refer to Appendix D for the method used to make these estimates. Note that individual estimates of demand reductions have been made for most, but not all of the recommended traffic alleviation measures. The information shown in Exhibit 25 simply tallies up the estimates from the individual measures for which estimates could be made. Therefore, to the extent that these measures are accu-

Exhibit 25: Policy Areas That Benefit Most from Recommended Traffic Alleviation Measures



rate, the total somewhat underrepresents the likely total effect of a complete summary of all of the recommended alleviation measures.

It is also likely that the intensive application of all of these measures would also produce a somewhat higher trip reduction than shown, due to interactive effects among them. As pointed out previously, one characteristic of these traffic alleviation measures is that they interact positively with each other. In other words, many measures being done at the same time can produce effects greater than the sum of the effects of each measure taken alone. Unfortunately, it is extremely difficult to forecast these synergistic effects and so, it has not been attempted in this report.

As can be seen from Exhibit 25, the policy areas which would benefit most from the intensive application of the recommended alleviation measures are the down-County areas of Bethesda, Silver Spring, and North Bethesda, in that order. Only one of those three, North Bethesda, is among the seven areas which have near-term projected LOS conditions worse than the standards for each area. As will be seen in the subsequent exhibit, the percentage reduction in demand for these areas generally corresponds to about one to one and a half years of growth in demand as contrasted to the near-term two year forecast.

Another relatively striking feature of Exhibit 25 is the relative regularity of the pattern of total trip reductions, increasing as one moves from the more rural areas to the more urban ones along both the western and eastern corridors. In the more urbanized portions of the County, there are densities and numbers of employees which provide more opportunities to ride-share, to bike, and to walk. Those are also the areas of the County with the most transit service available, thereby providing more opportunity to reduce vehicular trips. These suppositions are born out by examining the component parts of each bar which shows the number of trips reduced according to the groupings of traffic alleviation measures. Another partial explanation of this observation is that the recommended alleviation measures are more effective downstream where the flow of people movement coming together is larger than the upstream areas.

C. An Assessment of the Effectiveness and Cost Ranges for the Traffic Alleviation Measures Recommended for Initiation in FY 86-87

Exhibit 26 shows the effect of the recommended traffic alleviation measures on the near-term LOS conditions. This exhibit expands on Exhibit 14 given in Chapter II by showing, as the striped area within the demand bars (on the left side), the estimated magnitude of trip reductions due to the recommended traffic alleviation measures. The values for the total trip reductions are the same values as the ones shown in the previous exhibit, Exhibit 25. There is now enough information on the

exhibit to assess the effect of the recommended traffic alleviation measures on near-term projected LOS conditions.

A major conclusion from examining Exhibit 26 is that the recommended traffic alleviation measures would probably not change the characterization of the average LOS conditions in any area. That can be seen by comparing the bottom line of the chart in Exhibit 26 to the similar line on Exhibit 14. A noticeable result of the recommended traffic alleviation measures for the Gaithersburg East and Bethesda areas, would be that they would maintain the average LOS conditions throughout those areas at essentially the same LOS conditions found at the end of FY 86. The black shaded portions of the supply bars indicate the degree to which the new traffic need will remain unsatisfied by the new road projects and alleviation measures.

Exhibit 27 compares the reduction in demand that should be realized from the already programmed alleviation measures with the reduction in demand that would occur if the newly recommended alleviation measures were put into operation.

Exhibit 28 presents a summary of the specific traffic alleviation measures which are recommended for initiation in FY 87-88. Also presented in that Exhibit are estimated FY 87-88 operating costs and an estimate of capital costs, as appropriate, for each of the recommended measures. It shows a total additional operating cost of approximately four million dollars, and additional capital expenditures of about 2.6 million dollars during FY 87 and FY 88. It is recognized that in this draft Interim Growth Policy Report these costs should be viewed as being somewhat tentative. Some of these cost estimates are based upon discussions with MCDOT staff and some of the initial analysis they have been doing in preparing for their review of this Report.

Exhibit 28 also shows the subtotal for the groupings of the potential traffic alleviation measures. It shows that the grouping of Public and Private Transit is the largest portion of estimated cost. There is the potential that depending upon the degree of success of such programs, it may require capital costs for additional buses or even Metro trains and their associated operating expenses.

D. Recommendations for Monitoring Level of Service Conditions, the Effectiveness of Traffic Alleviation Measures, and Transit Use.

1. The Need to Monitor Level of Service Conditions and the Effectiveness of the Alleviation Measures

If the County is to ensure maximum cost-effectiveness of congestion alleviation measures and other transportation system improvements, more resources will need to be devoted to monitoring traffic volumes, transit ridership, bicycle use, and other quantifiable aspects of peak period travel in the County. Cur-

Exhibit 26: Two Year Change in Traffic Demand vs. Traffic Capacity Based on NEW RECOMMENDED ALLEVIATION MEASURES Plus Roads and Alleviation Measures Already Programmed

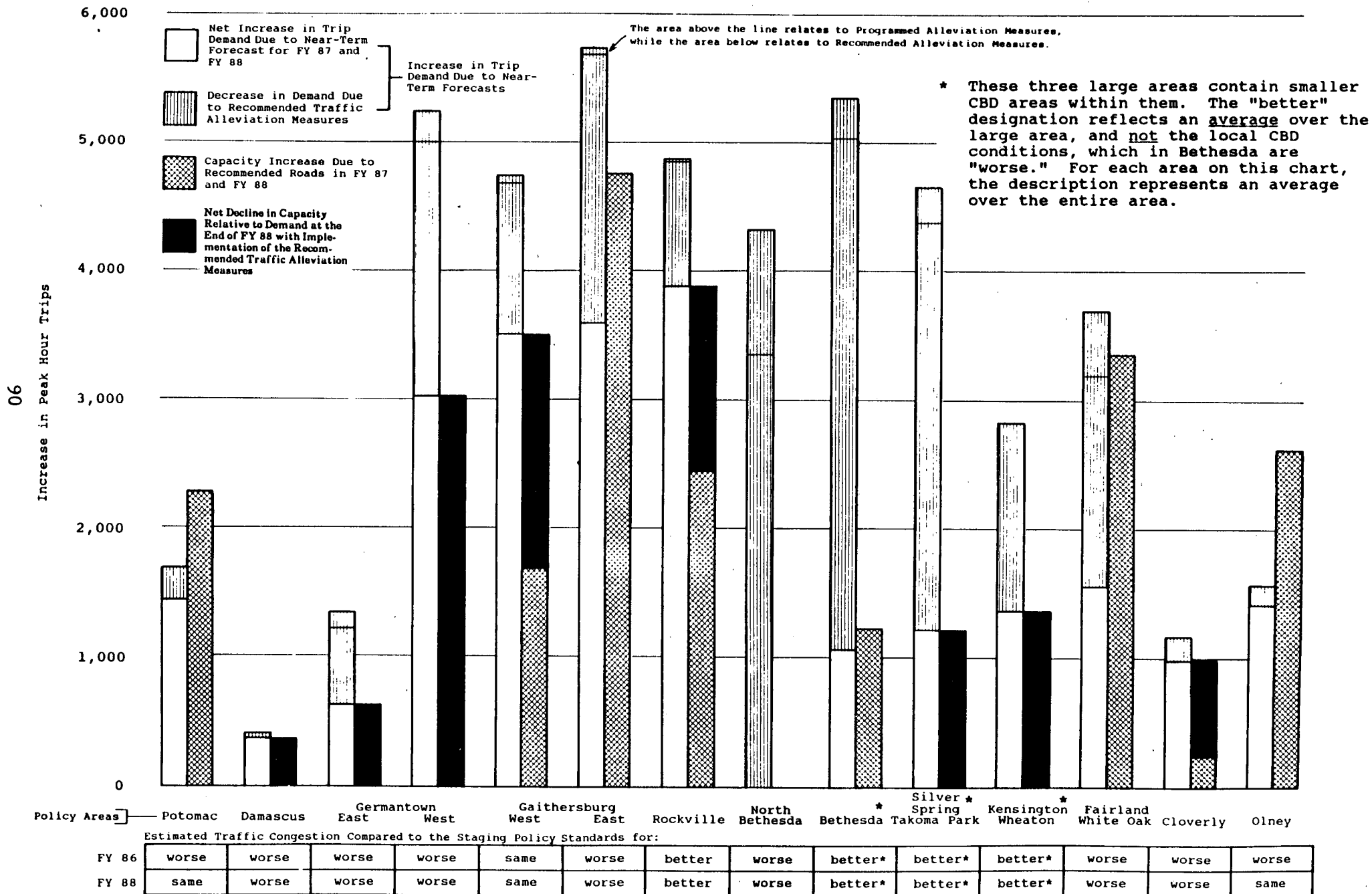


Exhibit 27: New Recommended Alleviation Measures Compared to Already Programmed Alleviation Measures

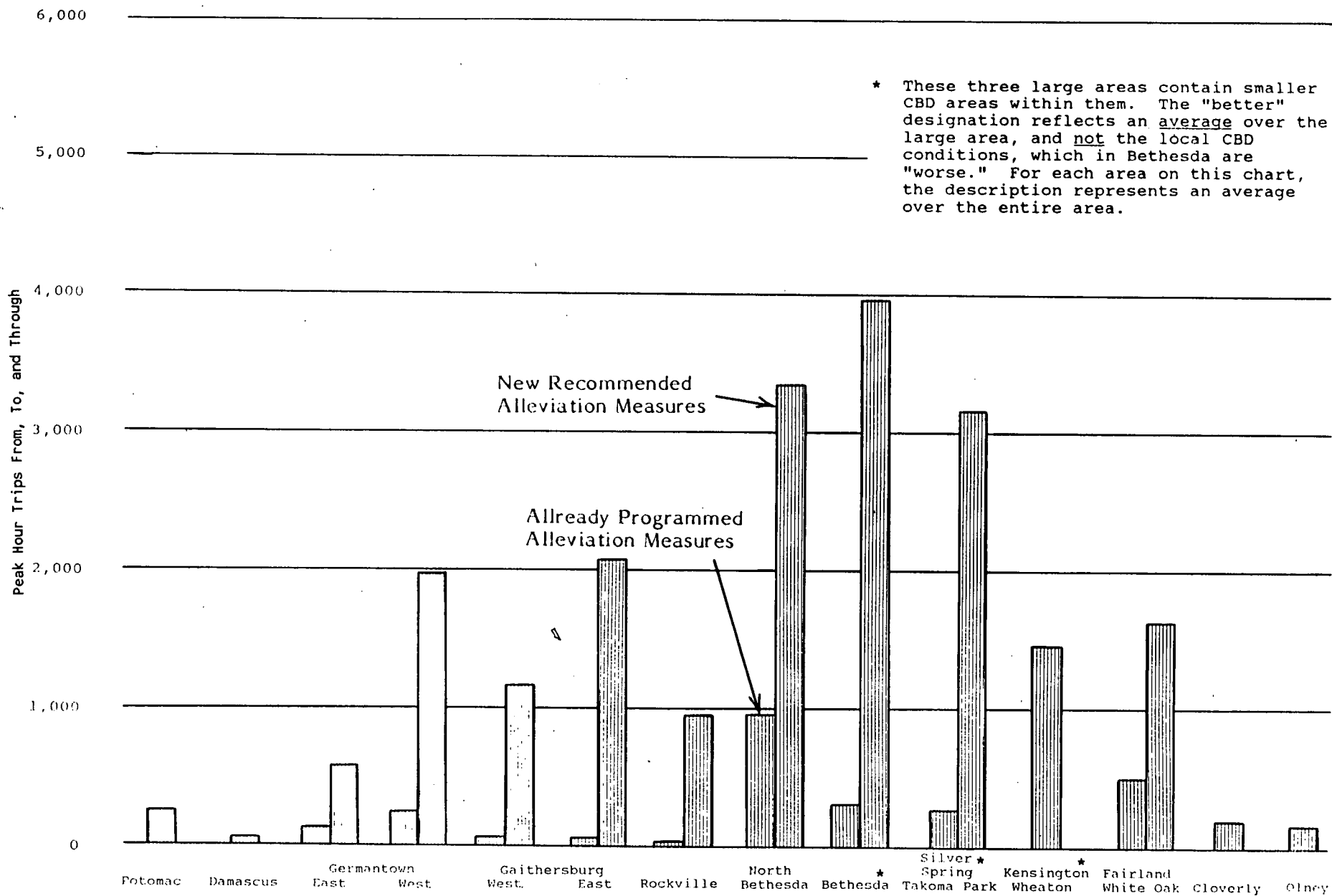


EXHIBIT 28- SUMMARY OF TRAFFIC ALLEVIATION MEASURES RECOMMENDED FOR
INITIATION IN FY 86-87 WITH APPROXIMATE COST RANGES

Traffic Alleviation Measure Grouping and Description of the Traffic Alleviation Measures		Operating Cost		Estimated
		FY 87	FY 88	Capital Cost
		(costs in 1000's dollars)		
<u>4. Ridesharing Measures</u>				
a.	Strengthen staffing of Silver Spring & Bethesda Share-A-Ride Program	56	75	
b.	Establish a Share-A-Ride Project in the Gaithersburg East Area	75	125	
c.	Intensify promotion of Ridesharing advertisement	400	*	
e.	Direct subsidy for vanpools	54	280	
	Subtotal	585	480	
<u>5. Public and Private Transit Measures</u>				
b.	Better utilization of Metrorail park and ride through fee increases and ridesharing	20	40	
c,d	Increase bus frequency and service coverage; develop operational improve- ments and tailored services to improve transit convenience	1,090	920	
e.	Provide discounted transit passes through employers	150	200	
j.	Provide periodic free transit service to encourage trial usage	(included in 4c)	*	
k.	Targeted fare policies to encourage ridership	75	**	
l.	Targeted marketing efforts to pro- mote transit use in areas needing traffic congestion alleviation	(included in 4c)	*	
n.	Provide new commuter fringe parking lots and use existing private lots			2,600
	Subtotal	1,335	1,160	2,600
<u>6. Bicycle and Pedestrian Measures</u>				
c.	Hire bikeway design consultant	50	50	
<u>7. Parking Measures</u>				
d.	Expansion of the "Get In" Program to Bi-County and Board of Education employees working in traffic con- gestion areas	15	15	
e.	Consider County legislation requiring private employers to take actions de- signed to increase the attractiveness of alternative transportation	250	**	
	Subtotal	315	65	
<u>8. Employment Activity Measures</u>				
b.	Employer provided shuttles to Metrorail	15	15	
	Increased collection of traffic data in critical areas	50	50	
	Total	2,300	1,770***	2,600

* Subject to review of cost effectiveness of current marketing efforts.

** Subject to studies soon to be underway.

*** This figure does not include funds that will be determined to be needed
for Measures 4c., 5j., 5k., 5l., and 7e.

rent transportation monitoring systems need to be improved in order to meet the needs of a fast-growing urban-suburban County where growth policy is an important public issue.

Counts of traffic on road links and intersections and counts of transit ridership are important information needed to analyze and monitor transportation problems in the County. Such counts are vital to understanding trends in traffic congestion and improving both road and transit services. In addition to the direct use by the operating agencies, these counts are the foundation for transportation simulation models used by Commission staff in recommending development thresholds and conducting Local Area Traffic Review as part of the administration of the Adequate Public Facilities Ordinance.

Before the Planning Board can approve a preliminary plan of subdivision they must make a finding that the transportation system will adequately serve the development. Current traffic counts at critical intersections affected by a proposed development are a primary input used in the analysis of local transportation system adequacy. In addition, traffic counts and associated estimates of Level of Service (LOS) conditions are important to the process of identifying and prioritizing transportation capital improvements.

The experimental nature of many proposed alleviation measures increases the importance of evaluation efforts. A primary means of assessing the effectiveness of congestion alleviation measures will be the analysis of changes from traffic and transit counts. However, proper evaluation of many of these alleviation measures will require additional data collection using targeted counts of traffic, bicycle and transit users as well as home and work-place based survey work. Only through surveying can travel behavior changes be clearly determined and related to discrete alleviation measures. Resources should be set aside specifically for evaluation of the impacts of alleviation measures to ensure that future efforts can be targeted in the most effective manner.

2. Summary of Current Programs that Monitor Level of Service Conditions and Effectiveness of Traffic Alleviation Measures

Traffic counts are made by the Montgomery County Department of Transportation, the Maryland Department of Transportation, and consultants working for developers. The most extensively used counts are collected by the MCDOT at intersections throughout the County. These manual counts tally all movements at the surveyed intersections for six hours in a day, usually including two hours during each of the A.M. and P.M. peak periods and two hours during the middle of the day. For selected intersections, twelve-hour counts are collected. Most intersections in the County are counted once every three to four years.

These intersection counts form the basis for twenty-four-hour Average Daily Traffic (ADT) estimates which are published in

map format each year by MCDOT. Six and twelve hour counts are factored up to twenty four hours using data from MCDOT's thirteen control stations which monitor traffic levels on a weekly basis. The County's nine permanent count stations which formerly monitored traffic levels on a daily basis have been inoperable for several years but are now being reactivated.

The Commission now maintains a computerized database of these twenty-four-hour ADT estimates for the years of 1972 to 1984 for most roads in the County. As MCDOT releases new ADT maps, this data is entered into the Commission's database to support modeling work and for analysis of LOS trends.

At the present time, MCDOT has a consultant working on upgrading their present system for producing annual traffic volume maps. This system will allow the MCDOT to produce their 1986 Traffic Volume Map early in 1987. However, the 1985 Traffic Volume Map was not available for the production of the FY 88 Annual Growth Policy. The most recent ADT volumes are used in interpreting the outputs from the traffic models used to establish development thresholds. This delay in release of the 1985 ADT map means that the analysis for the FY 88 Annual Growth Policy is based on 1984 ADT data, which is itself based on counts taken in 1982-1984 and factored to that publication date.

3. Improved Programs for Surveillance and Monitoring Level of Service Conditions, Transit Use, and the Effectiveness of Traffic Alleviation Measures

There are several problems that should be addressed to upgrade the County's capabilities for monitoring LOS changes and the effectiveness of traffic alleviation measures. First, more efficient data management tools should be applied to speed up the analysis and retrieval of traffic count data collected by MCDOT. Second, data management systems should be developed to encompass the extensive traffic count data collected by the private sector which now remains largely inaccessible to secondary users of the County's traffic counts. Third, additional traffic counts should be collected in fast growing areas of the County to ensure more timely and current data availability. Fourth, transit ridership count data should be collected for Metrobus routes in a form comparable to that used by Ride-On to better assess changes in ridership and to improve transit models now being developed by the Commission. Fifth, a bicycle traffic counting program should be initiated in selected areas of the County to monitor the effectiveness of non-motorized alleviation measures. Finally, an ongoing program to survey the travel characteristics of residents and employees in the County should improve the calibration of the travel demand models being used in preparing the Annual Growth Policy.

The development of a comprehensive traffic count database management system should be the top priority among these efforts to improve the monitoring of congestion problems. This database should be designed to meet the needs of both MCDOT and Commission

staff. There are needs for peak hour, peak period, and twenty-four-hour traffic link and intersection turning movement data. This system should accept computerized data from the MCDOT's TMC-48 data collection counters and produce output reports suitable for use by the Commission's transportation simulation model, EMME/2. This database system should be designed to include data collected by private developers and others. It should be designed to provide management support in allocating scarce MCDOT traffic count resources to those intersections with the oldest current traffic counts and to areas with the fastest traffic growth.

It is expected that about \$100,000 would be sufficient to procure, develop, and establish this database system. MCDOT will hire a contractor to conduct supplementary traffic counts at critical intersections in the traffic congested areas. An additional \$50,000 should be set aside for supplementary traffic counts at critical intersections not counted within the past eighteen months by either the MCDOT or the private sector. The Commission and MCDOT should work together in devising this new database system and in targeting traffic count resources to the most needed locations.

Funds are now available in the Commission's FY 87 operating budget to hire a consultant to make a number of speed and delay runs on most of the major transportation facilities in the County. This study will provide information on intersection LOS related to intersection delay. The study would provide base data that could be compared with subsequent speed and delay runs to determine if traffic conditions are getting better or worse over time and as alleviation measures are put into operation or a new transportation facilities are opened to traffic. However, additional evaluation work should be undertaken to assess the effectiveness of alleviation measures over the next several years. Such work will require some household and employer-based surveys of travel behavior and analytical support services. This work would also benefit the Commission's model calibration process. A budget of about \$100,000 for such evaluations would be adequate.

The Montgomery County Ride-On system now maintains files of bus boarding and alighting by bus stop by route, storing the data in spreadsheet form on a microcomputer. No comparable data is available for Metrobus routes operating in Montgomery County. A periodic survey of Metrobus ridership could likely be accomplished to produce comparable data with a budget of about \$25,000 a year. With a one-time allocation of \$25,000, this data, for both Metrobus and Ride-On, could be put into a new database for ongoing analysis of ridership trends, analysis of the effects of alleviation measures, and improved calibration of the EMME/2 transit models to be used in the forthcoming Annual Growth Policy analysis.

Currently, there is no adequate base of data for bicycle transportation planning in the County, despite the fact that from census data it is estimated that several thousand County resi-

dents commute to work by bicycle. Bicycle count and rider survey data is essential to measuring the effectiveness of bicycle-related congestion alleviation measures. A budget of \$15,000 a year should be set aside for such counts, which would be targeted in key areas affected by programs.

In summary, to begin to conduct these several monitoring activities would require additional appropriations of about \$250,000 to \$300,000 in FY 87 and then perhaps about half that amount on a continuing annual basis. The expenditure of \$50,000 for supplementary traffic counts at critical intersections is recommended for the short-term.

APPENDIXES

APPENDIX A

DESCRIPTION OF THE TICAL TRIP INTERACTION CALCULATOR PROGRAM

A. Overview

Development of the Interim Growth Policy for Montgomery County required analytical tools for quickly testing the effects of short-term growth, traffic alleviation measures, and transportation improvements on traffic congestion in different areas of the County. A common yardstick was needed to measure changes in demand related to the transportation system. It was important for this analytical framework to be consistent with the process already used by the Commission to set policy area growth thresholds based on the Capital Improvement Program (CIP) under the Adequate Public Facilities Ordinance (APFO).

In response to this challenge, Commission staff devised a new computer program called TICAL, the Trip Interaction Calculator, which can be applied in a manner fully consistent with the existing APFO process. The modeling methodology provides a unified framework for roughly estimating short-range past and anticipated year-to-year changes in traffic congestion for each of 15 policy areas in the County.

Because it is simple in form and is coded as a Lotus 1-2-3 spreadsheet program, TICAL produces very quick results and can be easily modified to adapt it for analyses of different types of traffic alleviation and Transportation System Management (TSM) measures.

B. Inputs & Outputs

The primary input to TICAL is an estimate of peak hour automobile driver trip productions at the home and/or automobile driver work trip attractions at the workplace end for fifteen policy areas in Montgomery County and for other jurisdictions in the Washington Metropolitan Region. These input trips may be existing trips produced or attracted by an area or they may be positive or negative marginal changes of trips produced or attracted by an area related to anticipated growth or to traffic alleviation measures.

The inputs needed by TICAL for an analysis of trends in traffic or projected land use changes can be readily derived using available trip generation rates to convert data on households and employment into expected home-based peak hour auto driver trip productions and work-based peak hour auto driver trip attractions.

The inputs needed by TICAL for an analysis of traffic alleviation measures can be readily derived using engineering judgement, past experience, or exogenous models to estimate the

number of peak hour auto driver trips expected to be reduced at either the home or work end.

The output of a given setup of the TICAL spreadsheet program is the anticipated number of total trips or marginal change in total trips in each of fifteen Montgomery County policy areas. These total trips are defined as the total of trip productions, trip attractions, and through trips for each policy area.

C. Methodology

There are two principal types of elements embedded in the TICAL program which allow it to relate trip productions by area to trip attractions by area and vice versa and to then estimate the number of through trips each policy area experiences. For the purpose of this discussion, "productions" are the same as "origins" and are assumed to occur at the home-end of work trips. Similarly, "attractions" are the same as "destinations" and are assumed to occur at the employment end of work trips.

The first principal element is two origin-destination (O-D) trip tables that give O-D percentages on a policy-area-by-policy-area basis. One shows the share of home based auto driver work trips originating in each policy area that are attracted to each destination area. The other shows the share of home based auto driver work trips attracted to an area that originate in each origin area. These two tables are derived from output of a run of the Commission's regional transportation simulation model, TRIMS, simulating 1985 traffic conditions.

These tables allow TICAL to estimate the number of trip attractions induced in each area by the input trip productions and to estimate the number of trip productions induced in each area by the input trip attractions, based upon the current distribution of auto driver work trip productions to attractions.

The second principal element is two identical trip interaction tables that describe standard routes for each origin-destination (O-D) pair through intervening policy areas. With simple summation formulas, these trip interaction tables add up the percentages from the O-D trip tables above to calculate through trips for each policy area. One interaction table adds up percentages from the production-to-attraction O-D table and the other adds up percentages from the attraction-to-production O-D table. The result is a separate calculation of the through trips due to travel from attractions-to-productions and of the through trips due to travel from productions-to-attractions.

The values in these two through trip tables cannot be summed directly on a matched O-D pair basis because this would double-count many trips. Ignoring one or the other of these tables would miss important components of through travel. To deal with this problem, TICAL is programmed to compare each O-D pair in each table and select the greater through trip value for insertion into a third table of "balanced" through trips.

By summing the through trips in each policy area from this third table of "balanced" through trips, the total number of through trips in each policy area due to productions and attractions in all other policy areas is estimated. This number is added to the input productions and attractions to yield the total number of trips in each policy area, TICAL's final output.

Intra-policy area trips, which are amenable to traffic alleviation measures at the neighborhood and community level, are separately estimated by TICAL as an output to ensure that these short trips are not ignored in the consideration of policy alternatives, such as the promotion of non-motorized travel.

D. Model Adjustments For TSM Measures

Unadjusted, the TICAL model described above can be used to evaluate changes in traffic levels over time in an area based on existing or forecast trip productions and attractions. In the case of traffic alleviation measures which have a relatively uniform impact on all inter-policy-area O-D pairs, such as higher parking charges, the unadjusted model should provide a reasonable analysis. However, in some cases alleviation measures, such as ridesharing and bicycle promotion, have quite uneven impacts that vary due to trip length. In other cases, uneven impacts result from major differences in service availability, such as the existence of high quality transit service for one O-D pair and the absence of any transit service between another O-D pair.

To use TICAL for analysis of alleviation measures where uneven impacts can be anticipated, the O-D trip table can be modified to reflect the greater effect of the alleviation measure on some O-D pairs than on others. In these cases, the O-D percentages are multiplied by adjustment factors and re-normalized so that the appropriate row or column totals add up to 100%, prior to application of the trip interaction tables and calculation of resulting trips.

Such modifications have been made to specialized versions of TICAL used for evaluating ridesharing programs, transit improvements, bicycle transportation promotion, and improvements to the bicycle access and egress systems for Metro rail stations.

APPENDIX B

DETERMINING THE RELATIONSHIP BETWEEN THE ESTIMATED LOS CONDITION AND THE STANDARDS FOR EACH POLICY AREA

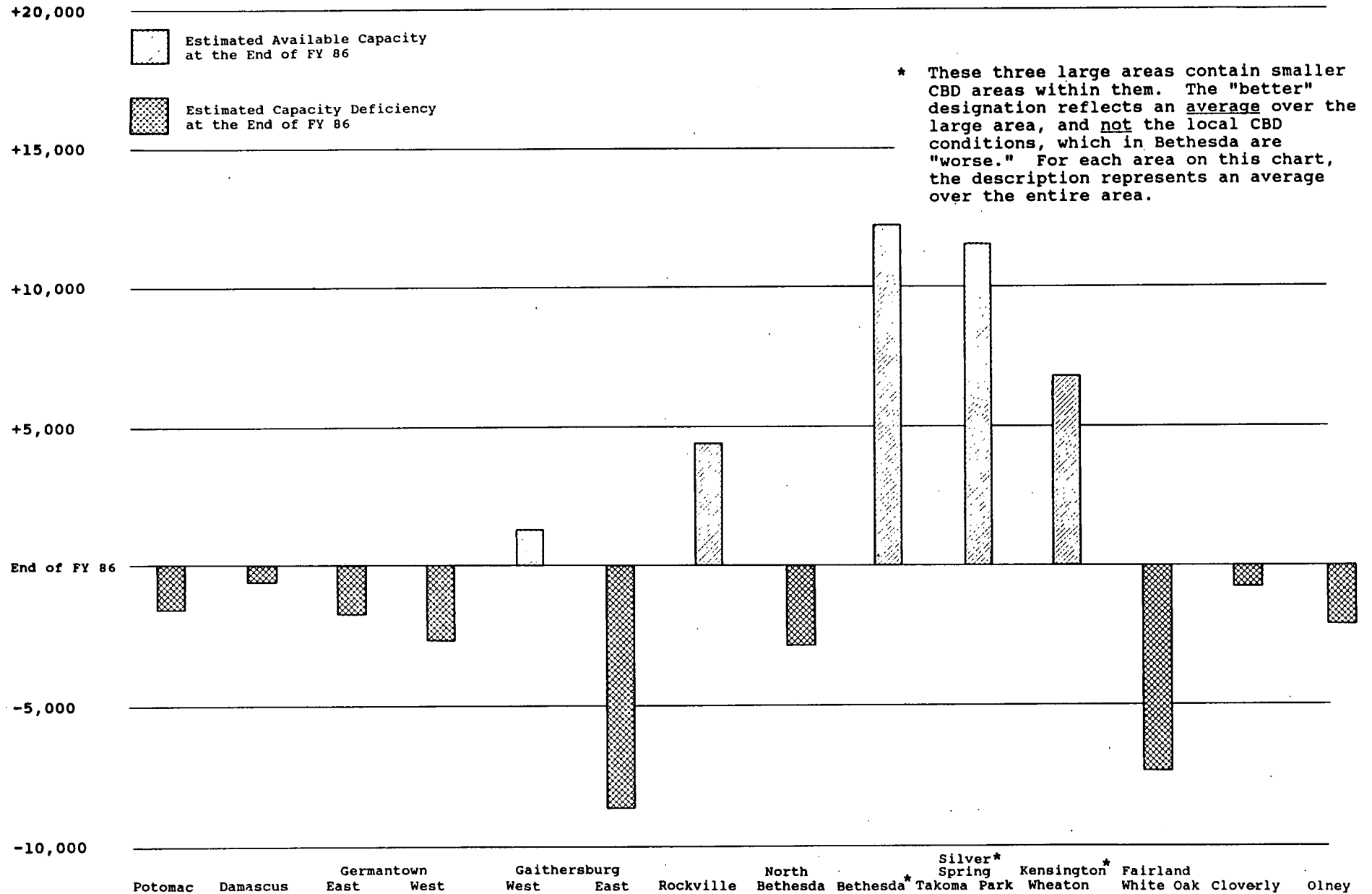
In the 1979 proposed Staging Plan, the concept of LOS standard for Policy Areas was identified. That concept was refined and used in the annual Comprehensive Planning Policies Reports produced by the Commission. That concept has been used in the determination of how much development threshold is available for each policy area.

After the LOS standards have been established for each Policy Area, it is possible to determine the existing average LOS conditions for each Policy Area relative to the defined standard. To make this determination, a number of techniques have been used in estimating the existing average LOS. The LOS standard established for each Policy Area is related to a ratio of volume to capacity for each segment of highway that is identified in the TRIMS model. The LOS standard is based upon an averaging LOS of conditions of all the segments of highways within each Policy Area.

By use of the TRIMS model, it is possible to analyze existing volumes for each highway segment to determine an average LOS based upon these existing volumes. That value can then be compared to the value for the standard to see if it is better or worse than the LOS standard established for each Policy Area. In that manner, it is possible to develop a ratio of existing average LOS to standard LOS to help gauge how many additional trips could be accommodated in areas where the existing average LOS is better than the standard LOS.

The following exhibit shows the relationship of the existing average LOS with the LOS standard established for each Policy Area. Policy Areas that have a black bar below the line are the areas that have an existing average LOS that is worse than the standard for that area. Policy Areas that have an opened bar above the line are areas where the existing average LOS is better than the standard for that area. The length of the bar is an attempt to estimate the size of the deficiency in trips in the Policy Areas that are identified as worse than the standard. The length of the bar above the line is an attempt to show surplus in trips for the areas that have an existing average LOS that is better than the standard.

Exhibit B1 : Estimate of Current Traffic Capacity (Surplus or Deficit) Based on Current Policy Standards for Each Area



APPENDIX C

Resolution No.	10-2191
Introduced:	<u>September 30, 1986</u>
Adopted:	<u>September 30, 1986</u>

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: County Council

Subject: Interim Growth Policy

Background


1. Bill No. 7-86, effective May 9, 1986, establishes procedures for preparation and adoption of an interim growth policy.
2. The Montgomery County Planning Board submitted to the County Council and the County Executive a draft Interim Growth Policy, dated June 26, 1986.
3. The County Executive submitted to the County Council his recommended revisions in the draft, retitled "Traffic Congestion Alleviation Measures," on August 6, 1986.
4. The County Council held a public hearing on the draft, as revised by the County Executive, on September 16, 1986.
5. The County Council held a worksession on the draft on September 22, 1986.

Action

The County Council for Montgomery County, Maryland, approves the following resolution:

1. The draft Interim Growth Policy prepared by the Montgomery County Planning Board, with the County Executive's revisions, is adopted as the Interim Growth Policy for Fiscal Year 1986-87 with the revisions by the County Council shown in the attachment.
2. Inclusion of Chapters 1 and 2 is an acknowledgement of this information presented in the document as a basis for the traffic alleviation measures in the adopted policy, and does not imply concurrence with all of their details.

This is a correct copy of Council action.


Kathleen A. Freedman, Secretary
County Council

INTERIM GROWTH POLICY

Revisions By County Council

Page 44, Exhibit 14: Two-Year Change in Traffic Demand vs. Traffic Capacity...

Net Decline in Capacity Relative to Demand at the End of FY 88, with Implementation of the Programmed Traffic Alleviation Measures

- Correction in description (or key) for black bars on the chart.

Page 59 Paragraph 5

OVER THE PAST YEAR, THE OPPORTUNITIES FOR SHARING RIDES, AND THE INCENTIVES TO DO SO, HAVE INCREASED SIGNIFICANTLY; (Restored Planning Board language:) however, the effectiveness of the programs in Silver Spring and Bethesda have suffered because of insufficient staffing levels. A commitment to increase and upgrade the positions of full-time staff members will be essential for fulfilling the program's potential and achieving its trip reduction goals. To help it function as it was originally intended, THE COUNTY [EXECUTIVE HAS INSTRUCTED] Council has appropriated funds for the following actions in FY 87:

Page 60 Paragraph 1

[Later, when the program's trip reduction goals are fully attained, staffing may be reduced somewhat.] The existing Share-A-Ride budget is approximately \$216,000. The incremental cost for increasing and upgrading staff positions is estimated to BE \$56,000 IN FY 87 and \$75,000 IN FY 88. The Council will support further expansion of this effort to the point of diminishing returns.

Page 61 Paragraph e.

e. [DIRECT SUBSIDY FOR VANPOOLS. IN ORDER TO EXPAND VANPOOLING, THE COUNTY EXECUTIVE IS INSTITUTING A PROGRAM WHEREBY NEW VANPOOL RIDERS MAY RECEIVE A MONTHLY BENEFIT OF \$15 (UP TO ABOUT \$200 PER POOL) FOR ONE YEAR, IF THEY JOIN VANPOOLS THAT WOULD REDUCE TRAFFIC VOLUME IN THE I-270 AND US 29 CORRIDORS. THE MAXIMUM COST OF THIS PROGRAM WILL BE \$54,000 IN FY 87 AND \$280,000 IN FY 88.] Support For Vanpools. The Council supports vanpooling as a more cost-effective alternative than bus services. It has appropriated \$75,000 for support and assistance to employers and building owners to organize vanpools. Part of these funds may be used as a subsidy to vanpool organizers, owners, and/or riders.

Page 62 Paragraph 4

The various types and location of transit services, policies on fares, and service levels, have evolved and been adjusted to meet changing needs and conditions. However, with the recent extension of the Metrorail to Shady Grove and significant changes and increase in bus services, a period of transit growth has given way to a transit system that has somewhat stabilized. Recent efforts have focused on evaluating efficiency, reallocating transit resources where needed, and designing specific targeted services to meet specific transportation needs. Most recently the County has taken a much more aggressive and creative approach to employing and encouraging transit as a means of counteracting specific traffic congestion concerns. At the same time, the Planning Commission has pursued strategies to encourage transit-serviceable development and developer-sponsored or -supported transit service. (Underlining indicates restored PB language)

Page 87, Exhibit 26: Two-Year Change in Traffic Demand vs. Traffic Capacity...

Net Decline in Capacity Relative to Demand at the End of FY 88, with Implementation of the Recommended Traffic Alleviation Measures

- Correction in description (or key) for black bars on the chart.

page 64 paragraph 3

Another measure to increase transit ridership and provide some traffic congestion alleviation would be incrementally increasing parking fees at high-demand lots. With this approach, more revenue is generated, the pattern of arrivals will spread over a longer period, and, it is assumed, more people will choose to save money and take a bus or a bicycle for their access trip. The net effect should be more rail riders, more bus riders, more revenue and less traffic on the roads. As long as the parking fee is not raised above a level that would leave spaces empty, this strategy should work. [Of course, the long term problem may be insufficient parking supply, not excessive demand. To this extent, the fee-increase policy may be unfair to patrons less able to pay higher charges instituted because parking supply is inadequate.] Of course, high fees may create a hardship for employees with modest incomes and no practical alternative to driving alone to work.* Finally, parking fees are a regional issue in the administration of the rail system and the policy on this issue may be affected by other, unrelated regional considerations.

* The County Executive has developed policies for dealing with such problems in order to make car-pooling feasible for many County Government employees.

page 65 paragraph 3--page 67

Provide periodic free transit service or passes to encourage trial usage. (Measure 5j) A free product trial is an established marketing measure to generate new, continuing business. The concept has been used, to a limited extent, in transit and with noticeable success. This should not be limited just to introductory or new services but more importantly be employed periodically on existing services. The proposal is to provide, on a rotating basis, a two-week or one-month period of free service on targeted routes. Low and medium productive routes are likely candidates. Each month a different set of routes would be selected and offered free-of-charge service coincident with a comprehensive, targeted marketing program to alert potential users. Even a modest incremental increase in permanent new riders could "amortize" the investment in short-term revenue loss. Such a program should involve both Metrobus and Ride-On. Permanent free services are attractive but expensive, and the Council has therefore decided that free services should not be continued for more than 90 days on any route unless specifically approved by the Council. Experience indicates that convenient service is more important than cost in determining transit usage. [Therefore, it is not necessary to run free services to keep riders, rather it is temporarily useful to run free service to get people to try it out. A variation of this approach would be to provide free two-week passes to potential users in target areas.]

page 67 paragraph 2

Selective "fare relief" in certain areas or corridors might be a worthwhile experiment to determine impact and to achieve improvement in problem areas. This should not be restricted to bus transit but include rail fare considerations as well. In particular, intra-County and reverse commute trips on rail are too expensive for the suburban market within which they operate. Consideration should be given to reducing fares on reverse commuting trips, since these trips use excess capacity which goes to waste in great part. Also long-term consideration should be given to equalizing Metrobus and Ride-On fares and further discounting rail-to-bus charges selectively or systemwide. A STUDY WILL BE MADE OF INAUGURATING A MONTHLY METRORAIL PASS, DISCOUNTING THE PRICE AND PROVIDING EXTRA CONVENIENCE FOR THE METRO PATRON, WHICH SHOULD BE A FURTHER INDUCEMENT TO RIDERSHIP.

page 68 paragraph 1

Operational improvements and tailored services to improve transit convenience. (Measure 5 m) Convenience is probably the most important determinant in transit usage. Therefore, there is an ongoing need to review services and make improvements in convenience. Various factors affect convenience but travel time is paramount. Improvements in traffic flow, frequency of service, and express operations are examples of actions to shorten travel time. Continued attention should be given to identifying potential improvements and tailoring services to make transit a more attractive and convenient service. Recent examples are express and shuttle operations and, of course, frequency improvements. Other examples include traffic operational changes to provide preferential treatment for buses and carpools such as bus lanes and traffic signal preemption. A program of continued innovation should be a component of the overall transit program. These improvements should be viewed as experiments and treated accordingly to allow flexibility in designing the most successful services. Correctly tailored services and traffic improvements will generate ridership and reduce vehicular traffic. ONE IMPROVEMENT THAT CAN BE IMPLEMENTED THIS FALL IS THE USE OF THE SOUTHBOUND SHOULDER OF I-270 BETWEEN MD 124 AND SHADY GROVE ROAD AS AN EXCLUSIVE LANE FOR BUSES. FURTHERMORE, THERE WILL BE STUDIES EXAMINING (1) THE FEASIBILITY OF HIGH OCCUPANCY VEHICLE LANES FOR BYPASSING CONGESTION ON THE MD 355 BRIDGE IN GAITHERSBURG, (2) THE PROVISION OF BUS PRIORITY SYSTEMS IN THE BETHESDA AND SILVER SPRING BUSINESS DISTRICTS and (3) provision of bus/HOV priority systems on East-West Highway between Bethesda and Silver Spring CBDs.

page 68 following paragraph 3

The commuter parking lots need not be very large; indeed, a number of small lots scattered through a residential area might be more convenient for the riders than one large lot. Nor need the lots be visible from main highways.

page 68 paragraph 4

THE COUNTY EXECUTIVE HAS [INSTRUCTED] recommended THAT TWO NEW FRINGE LOTS BE CONSTRUCTED IN FY88. THE WHITE OAK LOT, AT NEW HAMPSHIRE AVENUE AND COLUMBIA PIKE, COULD ACCOMMODATE 450 CARS AND WOULD BE SERVED BY EXPRESS BUS SERVICE TO THE SILVER SPRING METRORAIL STATION. THE GLENMONT LOT AT THE FUTURE GLENMONT METRORAIL STATION COULD HOLD 300 CARS. THE CONSTRUCTION COST OF THE TWO LOTS WOULD BE ABOUT \$2,600,000. The Council may approve these projects at a later date.

pages 69-70

Make the changes shown on the sheet labeled "M-NCPPC 9-19-86" (page 123).

page 76 paragraph 4

Staggered working hours and flexible working hours offer promise for substantial reductions in peak hour traffic problems by shifting trips from the peak period to the shoulders of the peak. The initial attempts of the County DOT in this area, however, have had only limited success. Few major employers have been willing to voluntarily alter their business hours or practices. Increased efforts must be made by the County Executive in this area.

Page 80 paragraph 3

Exhibits 17 to 22 presented in the previous chapter gave a judgmental evaluation of each of the potential traffic alleviation measures in accordance with three evaluation criteria: 1) relative difficulty of implementation, 2) relative cost to the public, and 3) the relative potential impact or effectiveness of each of the measures in alleviating traffic congestion. Exhibit 23 presents the results of a comparative analysis of the potential traffic alleviation measures by giving two cross-tabulation matrixes of the evaluation criteria. In the first cross-tabulation matrix, the assessment of the relative effectiveness of each measure in alleviating traffic congestion is arrayed against the assessment of the relative costs to the public purse. The second cross-tabulation matrix gives a comparison of the same assessment of the relative effectiveness of each measure in alleviating traffic congestion by arraying it against the assessment of the relative difficulty of implementation of each measure by the public sector. Each of the potential measures is given once in each of the two matrixes and are identified by their reference numbers. Exhibit 24 has been prepared to assist the reader in understanding Exhibit 23. Exhibit 24 presents the full list of the potential alleviation measures discussed in the previous chapter for reference purposes. The traffic alleviation measures which are recommended for initiation in FY 87 and FY 88 are highlighted in Exhibit 23 by having a circle placed around the number of the measure as given in Exhibit 24.

page 91 paragraph 5

The [COMPREHENSIVE TRAFFIC COUNT] development of a comprehensive traffic count database management system should be the top priority among these efforts to improve the monitoring of congestion problems. This database should....

Delete the word could, restore the word should throughout the rest of the paragraph.

Make corresponding changes to the preceding paragraph on page 91, to indicate the Council's agreement with the Planning Board that more efforts in data acquisition and management are urgently needed to evaluate developing troubles and the effectiveness of alleviation measures.

Page 92 paragraph 1

It is expected that about \$100,000 would be sufficient to procure, develop, and establish this database system. MCDOT WILL HIRE A CONTRACTOR TO CONDUCT SUPPLEMENTARY TRAFFIC COUNTS AT CRITICAL INTERSECTIONS IN THE TRAFFIC CONGESTED AREAS. An additional \$50,000 should be set aside for supplementary traffic counts at critical intersections not counted within the past eighteen months by either the MCDOT or the private sector. The Commission and MCDOT should work together in devising this new database system and in targeting traffic count resources to the most needed locations. (Underlined portion represents restoration of Planning Board language.)

Page 92 paragraph 2

sentence 10 delete the word would, restore the word will

Page 92 paragraph 4

line 6 delete the word COULD, restore the word should

a. Accelerate Construction of Bicycle and Pedestrian Facilities. Planned County capital spending for FY 87-92 includes \$2,141,000 for pedestrian facilities, \$3,850,000 for the Bethesda streetscaping improvements, and \$475,000 for bicycle facilities. This expenditure level for bikeways represents 0.1 percent of total transportation expenditures, although the portion of work trips made by bicycle is more than five times greater than this. In light of near-term congestion problems, bicycle and pedestrian improvement projects that could help in diverting peak period automobile trips to non-motorized modes should be identified. Such projects should be given a higher priority and put on an accelerated funding schedule. Any potential staffing constraints should also be identified and provided for. It would be desirable that the bikeway funds scheduled to be expended over six years should be expended within the next year or two. Funds for sidewalk development and repair should be similarly accelerated where possible. The identification of appropriate additional bicycle and pedestrian improvements to be built in the later years of the next CIP should be given priority by MCDOT staff.

b. Ensure that All Development and Road Construction Provides Bicycle and Pedestrian Facilities. To maximize future opportunities for non-motorized travel in the County, with both short and long term positive effects on congestion, better efforts should be made to insure that all major new development and all County road projects provide sidewalks and incorporate well designed bicycle facilities. These bicycle facilities should provide spatial separation from motorized traffic to neighborhood shopping areas, nearby points of express transit access, and nearby bicycle facilities that are in existence, programmed, or included in area master plans. The County Road Code currently provides for bikeways and sidewalks in prescribed situations.

c. ~~HIRE BIKEWAY DESIGN CONSULTANT. TO EXPEDITE THE PLANNING AND DESIGN OF BIKEWAY PROJECTS, CONSULTANT ASSISTANCE SHOULD BE CONTRACTED WITH THE SOLE RESPONSIBILITY OF PLANNING, DESIGNING AND MANAGING THE CONSTRUCTION OF BIKE PATHS. THIS WILL ALLOW THE PRODUCTION OF BIKEWAY PROJECTS TO BE IMPROVED AND MORE PROJECTS TO BE IMPLEMENTED IN LATER YEARS OF THE CAPITAL IMPROVEMENTS PROGRAM.~~

[illegible][illegible]

6. Bicycling and Pedestrian Measures

Par. 1 (unchanged)
Par. 2 (unchanged)
Par. 3 (unchanged)

a. Accelerate Construction of Bicycle and Pedestrian Facilities.

• (first 10 lines unchanged)

Replace

TO EXPEDITE THE PLANNING AND DESIGN OF BIKEWAY PROJECTS, CONSULTANT ASSISTANCE SHOULD BE CONTRACTED WITH THE SOLE RESPONSIBILITY OF PLANNING, DESIGNING, AND MANAGING THE CONSTRUCTION OF BIKE PATHS. THIS WILL ALLOW THE PRODUCTION OF BIKEWAY PROJECTS TO BE IMPROVED AND MORE PROJECTS TO BE IMPLEMENTED IN LATER YEARS OF THE CAPITAL IMPROVEMENTS PROGRAM.; enable the programming and development of bikeways and other bicycle related capital facilities on an accelerated schedule. Funds currently scheduled to be expended over six years should be expended within the next year or two. Funds for sidewalk development and repair should be similarly accelerated where possible. The identification of appropriate additional bicycle and pedestrian improvements to be built in the later years of the next CIP should be given priority by the MCDOT Contractor and MCDOT staff, in consultation with M-NCPPC staff and interested County bicyclists and residents. An emergency appropriation of \$50,000 will be considered to procure this consultant support.

b. (unchanged)

Revised
Narrative

c. Develop Personalized Bicycle and Pedestrian Commuting Demonstration Program. Funds should be provided for FY 88 to develop a personalized bicycle pedestrian commuting demonstration program either in the M-NCPPC or MCDOT. This program would be analogous in approach to the Planning Board's highly successful Silver Spring Share-A-Ride program, which focused on marketing carpooling. This demonstration program would work with area employers, civic associations, bicyclist organizations, ride-sharing coordinators, and the development community to encourage walking and bicycling, especially for commuting to work and school. The program's staff would encourage the provision of bicycle and pedestrian infrastructure (sidewalks, bikepaths, short-cuts for non-motorized travel, secure bicycle parking, workplace showers, directional signs) and marketing/educational programs (information on routes, cyclist and driver education, employer-sponsored incentives for bicycle and pedestrian commuting). The demonstration program staff would also identify key barriers to non-motorized transportation and suggest possible solutions to the County DOT, M-NCPPC, and the consultant retained to help expedite the planning and development of bicycle projects.

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